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FOR FORTSMOUTH AND PORTSMOUTERS INTERESTS
A PAPER FOR THE PEOPLE
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Horing published tumore than 50 years
has been certainembership in
The Antertown Fress
Half-Century Club
dis maided pecleich berkip in t
y
The Portsmouth Herald assumes no financial responsibilities for typo graphical errors in advertisements but win reprint that part of an advertisement which the typographical error occur Advertisers will please notify the ma agement immediately of any error which may occur.
Portsmouth, N. H., Tuesday, January 25, 1938.
LACK OF CONFIDENCE

Gleanings from the Past
From The Herald's Diary
TEN YEARS AGO-JAN. 25, 1928
Rev. Allen Brown, pastor of the Universalist church, dies suddenly.
Democrats planning to organize a Smith-for-President club.
High winds cause considerable damage in this section.
TWENTY-FIVE YEARS AGO-JAN. 25, 1913
Mr. and Mrs. Fred F. Parsons celebrate their 27th anniver-. sary of their marriage.
Man arrested in this city for Lawrence, Mass., police, charged with horse stealing.

FIFTY YEARS AGO JAN. 25, 1888

The Portsmouth Machine Co's. machine shop and plant,. foundry and other property sold at auction to Charles H. Mendum for $114,200.

Fifteen below zero this morning.

The pay of local police officers is $2 a day,

Big blizzard starts.

E. C. Moody of York hauls into city a very handsome stick of timber intended for a mast for the schooner Hattie Lewis.

"The Streets of New York" presented at the Franklin theatre by George A. Hill's original People's Theatre Co.

SEVENTY-FIVE YEARS AGO JAN. 25, 1863

At the navy yard there are about 1500 men at work and disbursements are about $60,000 monthly: The ships in port are Sasacus, steam corvette, completing; Patuxet, steam sloop-of-war, ribs up; Nipsic, screw corvette, keel laid; Agamenticus, iron clad, finishing.

ews of the
avy and
avy Yards

N

The real cause of the present business recession is lack of confidence in the future, states George H. Davis, president of the U. S. Chamber of Commerce. He attributes this lack of confidence to the passage of laws culminating in the undistributed profits tax and the threat of the wages-and-hours bill. Mr. Davis calls for assurances that no additional laws regulating business will be passed at this session of Congress

Formerly on Duty Here

Lieut. Comdrs. Stanley C. Norton and Watson O. Bailey, who were formerly stationed in the local yard (industrial department) are among the
t of officers named for promotion by the line selection board for the rank of commander.

Two New Hampshire men were also named by the board. Ottom R Renne. tramp. Lieut. Robert J. Donalas.

POLICE GET JOB
FOR ROCHESTER

HITCH HIKER

Boston, Jan. 25-Tired and hungry, after hitch-hiking from New Hamp
hire in search of work, Herman H. H-
dreth, 24, of 248 North Main street, Rochester, N. H, last night appealed to Cambridge pollen to lock him up as a

THERE'S THAT PESKY-SEA SERPENT AGAIN!

LIFEGUARD
!!!!
NEUTRALS
PIRATES
"SUB"
ISSUE

[PAGE BREAK]

No portion of the United States t-
day offers as many opportunities for
zmaking Money as can be found at
Great Falls, Mont., and on the reser-
vation just opened, in business, in-
ing, stock-raising or farining Ratca,
mapa nnd particulars will be furnished
by U. II. WARREN, Gen. Pass. Agent,
8. P. M. & M. Ry, St. Paul, Minu.
***
Sheet made.
Lap Dusters
Fass colors; will weak.
% Horse Sheets
Are made up strong.
5/A
5/ Horse Covers
Will hoay also off.
Fly Nets.
Arve Best and t
-Edward Duffork, of Bulter, was
attacked by an immense caglo last
the Hhenango and Allegheny Railroad,
Saturday above Batlor, on the line of
while on his way to his work in But-order some for you.
ler. He fought desperately with bia
back to a telegraph pule and was not
Don't get stuck with poor Horse
Sheets. If your dealer don't have
Ironsides Sheets ask him to
(Copyrigbled 1883, by Wa. Aras & Soms.]
much injured. He described the bird JOB PRINTING
having a spread of ten feet,
OF EVERY KIND.
AT THE MERHENGER" OFFICE.
Treasurer S
Ja
Publle notre llierely elven that ag
to the Art ol embly, directing thu
solling Hente ant uenteil lands for
of inxex, ole that the following sente
nu town lots, and brated Jatids in I
County, will be exposed to sale for ar
HLYON, Ht the Treantire's Omico,Indian
MONDAY, JUNE 11, 1888,
ut o'clock, p, m., al said day,
SEATED LIST.
Morta
ARMSTRONG TWP.
Otoners Nume
100 tobinson, 11, 1ks,

ARMADI
Piz
I&L Fox, John (beira) 1883
Iat Parker, James (holr) '86.....
DURBELL TWP.
100 Bakor, Fall '85-6
7 Gibson, Charte 66'
in
McGinity Mr (Colo) '85-6...
23 Risinger, Joshua'.
11 Waliorman, Jalla '80..
11 Johnston, Jonathan '85.
112 Brown, Pelor '85)
Indiana
Weekly Messenger
Indiana, Penn
5·16-1888

[PAGE BREAK]

show of food.
eached out its
orn Bob Sims
sharp ar er
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"More than
ot of a neigh-
reature limp-
g stump. He
other people's
thers off them
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as this have
y, then all his
by an insane
Is desperato
insane, too,
Lunght a Monster Eagle lo a Trap.
Pete Marker, who is working out at A H. Smith's sawmill, on Rifle areek, set a large trup, thinking to catch a monster be whose tracks were seen in the neighborhood. Several days after he wint out to look at his trap, but instond of the bear tound a large bald eagle, the largest porbaps ever seen in the Rooky mountains.
The cagle had been caught in the powerful jaws of the trap by one leg. just above the claws. He had dragged the immense trap, which was secured to a heavy log by a chain, into some brush more than twenty-five feet from the spot

where trapped, and was dead. Bo large
and strong was his leg that it was not
ale is clear as
a prunishment? broken. The eaglo was too large to
carry, so the trapper cut both legs off as
1sd beon fear-trophios He measured the huge bird,
lealt with for and it was twelve feet from tip to tip of
beginning in its out-fretatred wings.-Grand Junction
juliar mental New
wondered how' long 1 had known my
fellow travelors; it seamed as if we were
old friends. The captain was very
genial and delightfal; entertained us
with continual story telling of his life of
experiences, and altogether I was con-
scions that a most enjoyable period was
ending when we took te pilot aboard
off Sandy Hook."-New York Times.
'tead for Having the Grip.
There are some queer folk in England.
In Dover certain persons suffering from
Influenza have been fined twenty-five
dollurs apiece for appearing in public
places. What sort of a place is the in-
violate islo if a man with a cold in his
heal isn't allowed to go out of doors? If
an Englishman can't snoezo in an on-
nibns or a public house without be-
Ing hunled before a magistrate and fined,
what was tho uho of Bnssell and Sidney
and Harapden? A Dovor magistrate
would fine a man for having a cough in
publia Is the grip to be the ruin of
English liberty?-New York Bun.
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BAPTIST-I
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West Main
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1-23-1892

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PNAS PNAS

Pygmoid Australomelanesian Homo sapiens skeletal remains from Liang Bua, Flores: Population affinities and pathological abnormalities

T. Jacob*, E. Indriati*, R. P. Soejono, K. Hsu, D. W. Frayer, R. B. Eckhardt, A. J. Kuperavage, A. Thorne**,
and M. Henneberg*
tt
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Development, National Institute of Earth Sciences, Beijing 100101, China, Department of Anthropology, University of Kansas, Lawrence, KS 66045;
Laboratory for the Comparative Study of Morphology, Mechanics, and Molecules, Department of Kinesiology, Pennsylvania State University,
University Park, PA 16802, **Archaeology and Natural History, Research School of Pacific and Asian Studies, Australian National University,
Canberra ACT 0200 Australia; and Anatomical Sciences, School of Medical Sciences, University of Adelaide, Adelaide SA 5005, Australia
Contributed by K. Hsü, July 7, 2006
Liang Bua 1 (LB1) exhibits marked craniofacial and postcranial asymmetries and other indicators of abnormal growth and development. Anomalies aside, 140 cranial features place LB1 within modern human ranges of variation, resembling Australomelanesian populations. Mandibular and dental features of LB1 and LB6/1

either show no substantial deviation from modern Homo sapiens or share features (receding chins and rotated premolars) with Rampasasa pygmies now living near Liang Bua Cave. We propose that LB1 is drawn from an earlier pygmy H. sapiens population but individually shows signs of a developmental abnormality, including microcephaly. Additional mandibular and postcranial remains from the site share small body size but not microcephaly.

Indonesia microcephaly | skeletal pathology | asymmetry | dentition

In 2004, skeletal material from the Indonesian island of Flores was described (1) as the holotype of a new hominin taxon. Homo floresiensis. It comprised one fairly complete adult skeleton, Liang Bua 1 (LB1), plus an isolated lower left third premolar (P3) (LB2). Estimated from LB1 were notably low values for stature (1.06 m) and endocranial volume (380 ml), the latter trait all the more remarkable for its association with advanced microblade tools (2). This single individual's traits came to characterize broadly a new species. Other skeletal and dental traits reported as unusual were used to define a taxon that combines a mosaic of primitive, unique and derived features not recorded for any other hominin" (1). Additional skeletal remains described 1 year later (3) included not a single fragment of braincase, but it was incorrectly maintained that there are multiple individuals sharing LB1's traits (3). The second mandible (LB6/1) shows no traits that are unknown among modern Australomelanesians, and only some limb bones resembled LB1. There is no support for exceedingly small brain size, the focal characteristic of the postulated new species.

H. floresiensis is maintained to be distinct from the two human taxa recognized in the surrounding region, Homo erectus and Homo sapiens, interpreted by some as temporal subdivisions of one widely dispersed evolutionary species (4-6). H. erectus previously was held to have reached the island 840,000 years ago (840 ka), on the basis of Middle Pleistocene stone tools found on Flores (7, 8), remaining totally isolated while giving rise to HL floresiensis. Genetic isolation from other hominin populations is a necessary postulate, because prolonged isolation is needed to attain the requisite level of taxonomic distinctiveness (9).

This scenario was disseminated widely and endorsed (10) without critical examination of contradictions inherent in the data. It raises a number of questions. If brain sizes smaller than average for chimpanzees were normal for the new species, how were these hominins able to manufacture stone microblades postulated to have

www.pnas.org/cgi/doi/10.1073/pnas 0605563103

been hafted as compound tools (2), previously known to have been crafted only by humans with brain sizes three times larger? How could such tools, convergent in detail with those made by H. sapiens elsewhere but similar only in broad commonalities to earlier tools on Flores (11), not raise the question of contact between populations? How likely was it that Flores was reached by hominins only once during >800 ka?

Most importantly, premature elaboration of speculative evolutionary scenarios diverted attention from detailed study of the morphological characteristics of the specimens themselves. All

but lost was any realization that the species diagnosis that had attracted so much attention centered on a single, distinctly odd, individual. Although LB1 exhibits a very small skull and numerous anomalies, other skeletons that also exhibited serious abnormalities (12) were not used to establish new species, a point implicit in our initial publication on LB1 (13), which cited 10 examples of microcephalic skeletons from the Upper Pleistocene and Holocene (14, 15, ##). Other Liang Bua Cave bones described later merely (3) confirm general body size and unremarkable anatomical similarities.

The notion of a new, long-enduring species of humans raises problems concerning the supposed isolation of a taxon of large mammals. Assuming Flores was colonized by a founding cohort of a few H. erectus individuals who reached the island by crossing a water barrier only once, descendants would have comprised a highly inbred isolate, with the adaptive constraints implied by that consequently narrow gene pool. Confounding this problem is the question of whether the land area of a single island, Flores, was sufficient to support a hunter-gatherer population for some 40,000 generations. Furthermore, if this population had been isolated genetically up until the very recent past, how can identical anatomical features shared by members of the putative new taxon and subsequent H. sapiens be explained? Alternatively, if contact and interbreeding did occur, how could separate species status for H. floresiensis be justified?

Because of these questions raised by published descriptions of the holotype specimen, the initial diagnosis was challenged with an alternative hypothesis that LB1 exhibited abnormal morphological signs indicative of microcephaly (13, 17). These signs occurred in an individual sampled from a H. sapiens group that was small in

Conflict of interest statement No conflicts declared.

Freely available online through the PNAS open access option.

Abbreviations Liang Bua 1, LB 1, ka, thousand years ago, Pa, lower third premolar, Pa, lower fourth premolar

"To whom correspondence may be addressed. E-mail eyl@psu.edu or kenjhsu@aol.com

"Dokladal, M. & Horackova, L. (1994) Homo 45, Suppl., S40 (abstr.).

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Proc Natl Acad Sci
EVOLUTION
GEOLOGY

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e industry of|
i for the year
JOWO went in
Auclote Key
ed a cargo of
. such profit
in the busi-
also how it is that refuse or dirt is so
seldom met with as is the case in other

great capitals.-Now York Tribane.

A Monster Eagle.

Baford Hall, Jr., the 12-year-old
crippled the son of Mr. Buford Hall, killed an
the baby in- engle last week on his father's farm.
and has been The bird was in a tree some distance
since. Some away, when the little boy, who is an
Vossels, from cxcolient shot, Ared a charge of shot
-hundred-lon at it from a breech-loader, shooting is
nearly two
in the head. The bird measured six
actively en-
feat six inches from tip to tip. It was
naal revenue attracted to the place by the young
Jambe. The young, hunter is very
the Atlantic proud of his trophy, aud brought it to
let, Tho in-town on Friday to have it stuffed nnd
the head of mounted.- [Georgetown (Ky.) Times.
ulla county)
k with Key

Best Part of a Hide.

that it was dend.
At length she held
it to her bosom with one hand, and
dog might return.
tried to run on throo, lest the black
When alie got to a
safe tree slie clambered up as best she
could, bugging her precious charge
with one arm, and there she gave way
to her grief, and cried piteously,
tree, as if claiming his own. 'I have
while a kito sailed grimly round the
often wondered what she did in the
end with the little lifeless body; 1
cannot baliero she left it to the kite.
It would not surprise me to know that
she buried it, or laid it in some hol.
low aud covored it with leaves and
stoner."

The Wedding Ring Finger.

There are facts connected with the
ring finger, remarks an observant moi
alist, which render it in a pecnllar
handers. They are more successful than
any pitchers that go in the box,
Lowa, Dudy and McCarthy, of the Bos-
tona, are the greatest outtlelders in the
country. They form a trio that cannot be
teaten.

THERE were never so many errorless
games played in any season in the Kama
ttnie. The garne his surely got to be

science.
OxD thing is certain. So many games with such close scores never characterized the League sonson so early before. Is it penaltie tbat the ball is too dead!
THERE is no pitchor in the country to com pare with Kuroy, of Washington, in keeping close vigil en baso runners, except possibly Galvin of Pittsbur
THOMAS BURNS, the last of the old Chicago White Stocklogs except Anson, has accepted the offer to manage the Pittsburg tram. He will get a salary of $100.
IT has heen computed by the process of permutations and combinations tunt there are 478,101,UUD distinct ways in which the National League of twelvo baseball clubs can fais the season.
Tut report that Pitcher Clarkson is to be released by the Boston c.ub is authoritatively denial, but it is understood that he is to cbledy £gure on the bench and at the turnstilo during the remainder of the season.
No 1 Extra Uve s
Mixed
21SCELLATIOUS.
TALLOW-Country, .
Cily
BEEUS West Med'm clo'er
Mammoth Clover..
Timothy prune..
Timothy choice.
....
Grass.
Millet...
Buckwheat.
RAGS Country mixed
HONEY-White clover.
Buckwheat...
FLOUR-
CINCINNATI,
2:
WHEAT-No. 2 Red.
RYN-No. 2.
CORN-Mixed.
OATS
EGGS.
BUTTER.
FLOUR-
11ILADELP
WHEAT-New No 2 Red..
CORN-No. 2, Nixed....
OATS-No. 2, White

BUTTER-Creamery Extra.
MGS-Pa, Firsts....***
NEW YORK
FLOUR-Patents..
Indiana Progress
Indiana, Penn.
6-1-1892

[PAGE BREAK]

t thinks that other be or Mr. Parks in Bloomington trying to interest local-maylif
The Austin Capitalists in the scheme to erect a
l go up in a few days.
upany is a big concern and bas been White Horee inn at the World's Fair
Mr. Brown
La confident that it the factory was
ated here the business could be de
oped until SCO employes could find
ploying about 200 men.
rk in the manufacture of wagone.
grounde, in imitation of the one cele-
brated by Dickons in Pickwick Papers,
the origicul of which is said to be lo-
cated at Ispwich, England. The capital
required 19 $10,000. Bloomington
people bardly eeemed to rise to the oc-
cusion and proved to be rather back-
ward about coming forward.
BUNCIL & BONILLM
Their Access is merited. Firar, on
excolient counties in Var 23
counts, Illinois, 15-000, of the bit of th
is me of the bast fork in
zn; and has north of mater
county to support it to
no la sopportat ly farming interests al
the country twardy of secres of
mming, many of which are tearing ag
Largo prolic lands that pradace fro:
busts of com per BCTP to in
heat per 30 bushels of
'bere lands are offered at from
nere on y tornis of payment. Su
double and thrhle in salue. Hnsi
The State Hond Convention..
Ina executive committee of the Illi-
DURING the aleet storm Friday of last
16 Highway and Road Improvement week, a monster gray eule who has
BOCiution met at the Chicago Prosa been making Lake Fork timber bis hab-
ib roome Wednesday afternoon and itat, became so heavily freighted with
ide partial arrangements for the ice that he found aerial cav gation im-horus is sure nob: in
Dual meeting of the association, which possible and fluttered ignominiously to example is all that will be
given be

to be held in Springfield about the
dule of January Among the com-
teemon in nttendance were the presi.
ob of the association, D. W. Smith, of
ringfield; Captain T. F. Donoran, of
impody, and S. Thornton K. Prime,
Chicago. It is intended to make the
ming meeting an event of exceptional
threet, and gentlemen from all parte THE friends of Wm. Bower regret that by nix reare abl. everything in t
the country who are prominently
abtified with the rond improvement
be invited to attend and rend pract-
1. nanere hoerinn an tho anhiert
the ground, alighting is Tom Curtis
pasture, where he was easily captured
by Saunders Rice. His royal ornitho-
logical bigba■sa measures seven feet
from tip to tip of wings, weighs eight
and one-ball pounds and eats like a can-
nibal.-Mt. Pulaski News.
the statement published concerning his
having recovered from the rheumatism
by treating with a magnetic physician
18 not true. Mr. Bower did take a treat-
240 and mostly meadow. Pia.
2 frame welling a well pa
popend, pranded with wardrob
brick collar. No. 1 barn, 0x0, 20 fe
cave one smaller bare for golw
tara has wind-will amp and task:
of rarchand, neres bearing, balance 1
pens, pencte, plama, gooseberries,
trawberries, grapes na raspberrion.
ardar, a home in the broadest sepe of
three-quarter ofn mulo from ralirol
Irice, 895 per acre, one-half cash, ba
ume.
If this does not suit you send for list
You can be easted bere nach better (
Weekly Herald Dispatch
Decatur, Illinois
12.10.1892

[PAGE BREAK]

number by the disease, states
the trees by the use of scraps
ed in the soil around them,
and bore fruit for years.
A Large Eagle Killed.
Recently while hunting on the Catoc-
After practicing the iron

eing that the trees were dentin Mountain, near the Adamstown road,
4. After practicing the iron Mr. Martin L. Shaff, of near Jefferson,
e states that the trees grow shot a large eagle, a cross of the black
and grey, which measured six feet from
tip to tip of wings and three feet from
head to tail, and weighed nine pounds.
The claws of the bird, when expanded,
were six inches in diameter. There wes
a flock of eleven of these birds dying
high in the air when Mr. Shaff made the
shot which broke the wing of one of
them and brought it down.
RUP FIGS
Madison, Ind., one of u
bers of the General As
session at Washington, 1
Presbyterian Church
Beale and Dr. Barnard
same section of Pennsy
cated in the same sch
was pastor at Bellefont
was married to one of
Miss Mary Mooze, and 1
the officiating clergyma
Mr. Irving Albaugh w
in the Reformed chapel
ing at the usual.bour.
The Rev. D. S. Fouss,
delivered the sermon
Frederick News
Maryland
5.20-1893

[PAGE BREAK]

An unusually large number of eagles
are seen throughout the Catskill and
Shawangunk mountain ranges this
fall lonters and others bave already
met with several adventures with
these monster birds
Mary Van Buskirk of Gulf Summit
recently saw a large eagle swooping
rea's
1 the
pie
res
The
the
Diog
MES
ople,
down upon a bez Sue rico frigusen

the bird away, but it attacked her and
sunk its los arms. Ste
seized a batchet with which she sac
ceded in dlling the eagle.
I
A bor named Frank Louister had a
desperate fight with a moaster eagle; ne
about six miles from Woodburne a few
days ago, and he was likely to be orer-
powered when help arrived and one of
the birds was billed.
POPULAR
YOUNG FOLK MARRY.
SE
Sunday News Herald
Syracuse, NY
11·19-1893

[PAGE BREAK]

THE SUNDAY HERALD: SYRACUSE, SENDAY MORNING, NOVEMBER 19

[PAGE BREAK]

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and the effect was as grent
rtinuous garland crosso
highest afer at tho time the winner
bronsted the Lapo. The rent of the
mendon was then expended in alto
hroud loares, which were distributed
erosottes are something among the poor of the town.-York-
mer loops of ribbon rshire Hural.
circles iegtier, such as
iuled usnully understand
Llu. They are made with
e new-they are, indeed,
A Monster Eagle.
finally went to
ton,
armed with the rerumnendations o
the Naval Academy, urged his claim
upon the Surgeon tieneral,
Do you see the Washington Mon
tunent out that window?" asked the
official.
Yes, sir," promptly replied thu
Guiler.
To test his cyonight as well as h
"Sue that sparrow on the top or
the nonument"
Without hesination, the sailor re
plied. Na. sir"

ors. It would bo impossl- Mr. J. R. Davis, of Colquitt, pre-honesty, another question was pa
nero luynan to explain; sentud us a fow days ago with the pounded.
rtist whose ne fingers talon of an immense engle which he
ed to fashion such things recently killed with his unerring
it is done, and she conid! Wincheslor. The huge bir mensareil
six feet nine inches from tip to Lip of
ybody else.
or is clint those bits-thoy wings and seven and one-linlf inches
lways loops of volvet or from rear to front toes. With ease
Ton that ry nut from tho this winged monsto: coull have car
crushed or curied or other ried away a small child or lain.
pulated till they aro ae [Blakely (Ga.) Nows.
"Neither do I, nider the cliatj
oxuning officer. Your eyesigh
seuns to the good enough, and I sul
at once order your reinstatement in
the navy [Daltimore Su
Mckean Democrat
Smethport, Penn
6-1-1894

[PAGE BREAK]

PNAS PNA
ature, as still common on Flores today. Several of the publica-
have been contested (21, 22).
ions (18-20) supporting microcephaly subsequent to our own (13)
From the beginning, the "H. floresiensis discovery" was treated as a matter of hominin taxonomy and phylogeny. Curiously, however, comparisons of LB1 were made mostly with H. sapiens from other geographic areas of the world, principally Europe. Yet it would have been more appropriate for a supposedly novel human species from the Australomelanesian region to have been compared with other human populations, present as well as past, from that region. Therefore, in contrast to erecting a new species (1, 21, 22), we consider the alternative hypothesis that LB1 was an Australo-melanesian H. sapiens who manifested microcephaly, which commonly is accompanied by other developmental abnormalities. This hypothesis is testable by comparing the Liang Bua remains with extant Australomelanesian H. sapiens populations to assess whether its complex of normal characters conforms to regional patterns, while also documenting cranial and other skeletal features of LB1 that are developmentally abnormal.

Following the initial reports in 2004 (1, 2), the Indonesian chief investigator (R.P.S.) of the original research team asked T.J. to restudy the bones, who in turn invited several of the other authors (E.I., R.B.E., M.H., and A.T.) to join him. We present results of our examination of the original skeletal material, plus previously unreported data from an appropriate living reference population, beginning with an alternate interpretation of Flores' paleogeography.

Evidence Against a New Species

Demography, Continuity, and Isolation. For nearly 4 decades, arche-

ological evidence suggested early human presence on Flores, with stone tools reportedly associated with bones of Stegodon estimated to have lived 750 ka (23). Additional debated findings extend this date to 840 ka (8, 24). If correct, these reports place humans on Flores by the latter half of the Quaternary. To support the hypothesis that H. floresiensis evolved in extended isolation there, it is necessary to prove that island was reached once and only once, as contended (2), yet in numbers large enough to embody genetic diversity sufficient to establish a new mammalian species (25) within a relatively short period, then maintain a viable population for some 40,000 human generations in a restricted land area. Such restrictions are not supported by the data for elephant colonization of Flores, because stegodons reached the island at least twice during repeated Pleistocene sea-level oscillations (26). Given this evidence, the premise that humans must have been limited to a single colonization event (2) is unjustifiable.

Global cooling leading to Northern Hemisphere continental glaciation started at the beginning of the Pleistocene, 2 million years ago. Oxygen-isotope studies of deep sea cores indicate more extreme variations, starting with large ice volumes 600-900 ka (27, 28). That time range encompassed lower sea levels, reducing odds against early hominins crossing narrowed seaways beyond Java Later glaciations also were intense, with >30 glacial and interglacial stages during the last 700 ka. Continental glaciation reached its maximum extent during Isotope Stage 2 of 18 ka, just before the deglaciation leading to the present high-sea-level strand (Isotope Stage 1).

During the glacial stages, water gaps between islands were reduced by lowering global sea-level due to increase of polar ice-volumes documented by isotope studies. At glacial maxima, Bali was contiguous with Java, and a transient unitary land mass connected Sumbawa through Komodo and Rinca to Flores, leaving water gaps of just several kilometers on either side of Lombok (29).

Eckhardt, R. B. Kuperavage, A., Sommer, H. J., Jr., & Galik, K. (2005) Poster presented at the International Society of Biomechanics XXth Congress/American Society of Biomechanics 29th Annual Meeting, Cleveland, OH, August 2, 2005

Assuming that the earliest hominins reached Flores during the first intense glacial stage 750 ka, there could have been numerous hominin arrivals during later glacial stages with low sea levels, before the final higher sea levels at the beginning of the Holocene (10 ka) again might have constrained contacts. These environmental perturbations replicate on a more limited scale events that occurred elsewhere when various geological phenomena transformed the Mediterranean Sea into a desert and back to a massive body of water (30), with consequent effects on mammalian faunas.

Although today the 14,200-km² island of Flores has a population of >3.5 million people, this small land mass, even if entirely suitable for human habitation, would have been capable of supporting far fewer humans at a hunting-gathering subsistence level. Conventional figures of 1 person per 25-2.5 km² would yield one-generation total census population sizes (N) of 570 to 5,700 people and much lower effective population (Ne) sizes (31). These figures are below minima estimated (5,816-7,316 adults) for survival of vertebrate

populations over 40 generations (32), which is 0.001 of the term posited for human isolation on Flores (2). An alternative approach (33) using home ranges rather than N or N. (34, 35) yields similar results.

Reduction in size on Flores is unsurprising in an ecosystem characterized by a humid climate, hilly topography, and abundant undergrowth of vegetation. Maintenance of body temperature alone can be a sufficient selective factor for small body size in such surroundings. Selection need only be sufficient to overcome limited levels of gene flow expected on an island separated by stretches of water constituting just filter barriers. Many of the surrounding regions (Peninsular Malaysia, the Andaman Islands, Sumatra, Java, Sulawesi, Papua, and Northern Australia) include populations relatively short in stature (c.g., ref. 36). Diminutive body size does not in itself constitute convincing evidence for either isolation or speciation, because size fluctuations occur repeatedly in mammalian, including human, lineages. In living African pygmies, for example, spatial and genetic isolation manifestly is incomplete (37). On Flores, there were two separate Stegodon invasions, minimal distances from islands occupied by other human populations, a low probability that colonization by an original founder group provided sufficient genetic diversity for adaptation over tens of thousands of generations, and insufficient resources available for sustaining in isolation an adequate effective population size of hunter-gatherers. These are strong arguments against the evolution in situ of a new hominin species.

Neurocranium and Face. Considerable damage was done during excavation to the LB1 neurocranium, face, and mandible. Later, when the specimen was disassembled and reconstructed, the skull surface was heavily varnished (1), obscuring some details. However, despite these problems, many anatomical features are clear. Aside from abnormalities discussed below, not one of the 94 descriptive features of the LB1 cranium or the 46 features observed on both mandibles (see Table 1, which is published as supporting information on the PNAS web site) lie outside the range for modern humans (38-41) from the region. The form of the superciliary area, nasal floor, subnasal region, orbits, and occipital superstructures of LB1 all are encountered routinely among Australomelanesians. Other neurocranial features, excluding small size, asymmetry, and damage (see Supporting Text, which is published as supporting information on the PNAS web site), also lie within the range of Australomelanesians. Purportedly (1), the LB1 cranium displays two skeletal features "not seen in modern humans." In one, "a deep fissure separates the mastoid process from the petrous crest of the tympanic" bone. The other is "a recess between the tympanic plate and the entoglenoid pyramid" on the medial part of the mandibular fossa (1). Australian and Tasmanian crania commonly display both of these features (39-41). The latter trait also is present in two Pleistocene Australians, Kow Swamp 5, and, in a reduced form, Keilor (42).

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largest ball cagles ever seen in that sec-
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off a three-year-old child named Nettle
Hinkle. The little one was playing, walking up
along a small trout stream near the hands around a
main road, running (hrough the valley.
Miss McDowell was on her way to visit
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to take the wounded child in her arnik
tho bird attacked her fiercely.
Miss McDowell would not retreat and
Jeare the chill behind, so, standing over
her, she beat uit the attacks of the bird
as best she could. The eagle was now
furious. It whirled about and dashed,
beak and talons extended, at the brave
girl, who beat it off again and again and
again with her arnis. The beak and
talons wounded Miss McDowell severe-
ly, and as she did not have a weapon
she was unable to retaliate with effect.
With gashes on her arms, head and
shoulders, she was rapidly losing
ODOG ODLOG strength, when she thought of her hot
pin. Grasping this firmly, she made
repeated stabs at the bird, which, de-
spite its wounds, persisted in the at-
tack. Finally, as her strength was
about gone, she managed to grasp the
bird by the neck, and with one fortu-
nate thrust sent the needle through the
head of the bird, killing it. Then, over-

come by lier wounds, she fell unconscious neries the body of her terrible antagonist.
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Little Nettie, badly wounded though she was, made her way to her home, a Ehort distance away, and told her parents that "a good lady saved me from a bud bird at the creek." While Mrs. Rinkle attended to her child's wonnds, Mr. Blakle hurried along the creek and soon came to the scene of the fight. Ile carried tho still unconscious young woman to his home and sent for a doclor. Mine McDowell soon recovered consciousness and after her wounds were dressed was driven home. She will be able to be about. in a couple of weeks.
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alience on the jubilee convention of the Missionary society and boards of the Christan church. The sessons will continue until Thursday night. Communion services were celebrated in Music hall, and three large overflow meetings in churches so as to accommodate over 10,000 communicants.

Attacked by an Eagle.

Ashtabula, O., Oct. 16.-An immense eagle attacked Mrs. Arthur Stewart of Saybrook, this county, while she was out in the yard and seriously injured
ber. The bird killed
a dog which
came to her assistance. The bird escaped just as Mr. Stewart
returned

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Zanesville, O., Cet. 16.-Robert D.
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Sandusky Star
Sandusky, Ohio
10-16-1899

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whistle was blown and every effort made
to attract the attention of the man, but
the train could not be stopped in time to
samo his life. Quirk was a student of
Pio Nono college at St. Francia and was
on his way home when killed.
LARGE EAGLE KILLED.
James Dooley of This City Rrings Down a
Feathered Monster,
The American eagle which is one of
the emblems of our country and many
years ago was a common bird through-
out the land, has gradually disappeared
one by one until now it is a very scarce
bird and only now and then is one seen

in this section of the north.
Jim. Duoley. n musician of note and a good citizen of our city, while out squirrell hunting near Kellogg's Corners, in Racine county. was skirmishing the woods in that section, when all of a sudden he heard a loud noise in the tall tree tops, and mue' in his surprise it proved to be a large American eagle measuring 7 foot 9 inchies from tip to tip. He carried a ride and with a steady aim sue corded in putting a ball through one of the joints in the bird's wings. The bird in trying to fly fell to the ground. Dooley having a revolver with him sunk another shot into the eagle's body. killing it instantly. He brought it home and now Kammerer, the taxidermist, is mounting it.
Information About the Star Conre:
So many inquiries are being made regarding the Star Course that the follow ing statement scoms called for: The prospects are good for the entire house wing sold. If any regular two dollar t ticket idders are obliged to take chairs, s :L rebate of twenty-five cents on eaci Lirket will be made. Absolutely no seats will be reserved unti: the apening of the board next Monday evening. Ort. 23, ut seven o'clark, at the assoriation building. No employe of the association is permitted to reserve seats for anyone, and no "members" will be given on or assigned. ticket holders being expreted to arrange their own "line." Copies of the elegant prospectus can still be had by applying at the building.
The Malet & Davis Co. have not neg lected the opportunity to make a master stroke for the Bullet & Davis Co. They We have offered the conuitice having in clure the murel.nsr of a home for Ad. et to
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Fig. 1.
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Absence of external chin is common in Australomelanesian populations. Here we show Rampasasa individual No. 26, who lacks a chin. Our work on the Rampasasa population determined that 93.4% of the sample have neutral (flat) or negative chins. Absence of a chin cannot be a valid taxonomic character for the Liang Bua mandibles. (Photograph is by E.I.)

Absence of a true chin has been listed as a distinguishing feature (1, 3), but our observations on the Rampasasa population determined that 93.4% of these people have neutral (flat) or negative chins (Fig. 1). It is not valid to contend that chin absence is a taxonomic character in separating the LB hominins from H. sapiens. Finally, mandibular size is not a valid criterion. For example, of five partial mandibles from Klasies River Mouth (KRM), three clearly are smaller than LB1 and LB6/1 (43). One KRM mandible is 66% of the size of LB6/1, yet virtually all researchers regard the KRM sample as H. sapiens. Overall, the Liang Bua sample is characterized by many features that, rather than being unique, are widespread human structural polymorphisms.

==

An unarguable feature of LB1 is its small brain coupled with a short stature. Compared with our Rampasasa sample, with average cranial capacities of 1,198 ml (n 41) for females, 1,354 ml (n 35) for males, and 1,270 ml for the combined sex sample, LB1's cranial capacity directly measured using seed displacement was 430 ml. This volume is slightly higher than other published estimates, but we removed from the endocranial surface some breccia that had lowered earlier estimates. Comparatively, LB1 falls 5.5 SD below the combined sex Rampasasa mean, whereas our estimate for stature falls 3.3 SD below Rampasasa average stature of 1.46 m. A similar ratio characterizes some families of microcephalics. For example, Burton (44) found individuals in three successive generations with head circumferences some 6 SD below normal population means and statures 3-5 SD below average in this lineage. Microcephaly is clinically heterogeneous, with numerous syndromes in which very small brain size is but one sign. Causes of microcephaly range from defects at known genetic loci to numerous chromosomal and environmental disturbances that can affect prenatal or postnatal development. Review of 184 syndromes in which microcephaly is one sign (45) shows body size reduction commonly is another: 57 are identified explicitly as exhibiting short stature. Associated signs include facial asymmetry and dental anomalies, as well as trunk/limb disproportions, overtubulated bones, and signs of paresis in the postcranial skeleton (45). Another indication of abnormality is the advanced suture closure in LB1. As described originally (1) and confirmed by us, "[w]ith the exception of the squamous suture, most of the cranial vault sutures are difficult to lcoate and this problem persists in computed (CT) scans." We found a portion of the right lambdoidal suture preserved ectocranially, but this level of suture closure and obliteration is atypical for any species of Homo, Australopithecus, and most nonhuman pri-

mates. Age cannot be a factor because all sutures should be open

in the LB1 young adult. It may in fact have led to the neurocranial deformities discussed below. As reviewed below, we find evidence for all these signs in LB1, but we do not attempt diagnosis of a specific developmental syndrome from its skeletal remains. Rather, we simply test whether LB1 represents the developmentally normal holotype required for a new species (46) or an abnormal member of our own.

After allowance for left orbital region damage, asymmetry affects frontal breadth, position and contour of the lower orbital border, angle of inferior nasal margins, location of the (broken, off-center) nasal spine, and expression of the canine juga. Asymmetry also extends to other areas on the cranium. Detectable in the original figure 1 in ref. 1 but not mentioned, and more clearly here (see Fig. 7, which is published as supporting information on the PNAS web site), the palate midline is rotated 4-5° from the midsagittal plane, so that a line extending the midpalatine suture does not bisect the foramen magnum. In addition, right parietal and left occipital bones are flattened compared with their more rounded antimeres. The nuchal torus is markedly asymmetrical, and the antimeric mastoid regions differ greatly. This pervasive asymmetry suggests growth anomalies producing a vault and face with substantial lateral contrasts.

Patterns of asymmetry in the human skull are well documented (47-49), with typically greater neurocranial asymmetries than in the face, where asymmetries are slight overall (50, 51). For mandibular dimensions (52), the largest mean asymmetry was 0.77 mm. For the nasal region (53), the largest mean difference was 0.4 mm, with most differences <0.1 mm. The same study reported left/right orbital height variation from 0.20 to 0.39 mm and breadths from 0.00 to 0.38 mm. These differences represent small (typically <1%), fluctuating asymmetries. Reanalysis of these data (49) supported the earlier statement that "(t)he face is the most symmetrical region of the skull (48). Similar results were obtained with radiographic and stereophotogrammetric methods (49, 54, 55). Studies of facial asymmetry are medically important and have diagnostic applications, with low single-digit lateral deviations in percentages or millimeters marking thresholds for clinical intervention (56, 57).

We quantified craniofacial asymmetry for LB1 to the extent possible by dividing digital photographs of the cranium into right and left halves along the midsagittal plane by using Photoshop (Adobe, San Jose, CA), then making composite images by mirroring the left and right sides (Fig. 2). On a digital image of the face, we also measured left and right deviations from the midline. Six of seven measures were larger on the right, by amounts ranging up to nearly 40% (distance from mental foramen to midline). The only measurement larger on the left was the 6% for distance from the orbit lateral rim to midline (see Supporting Text). Gauged by anthropometric (47-53, 58) and clinical (49, 54-57) standards, LB1 asymmetry exceeds clinical norms where determinable, providing evidence for rejecting any contention that the LB1 cranium is developmentally normal.

Dentition. Various aspects of the teeth are argued as taxonomically distinctive for LB1 and LB6/1 (1, 3). These traits include P3 teeth

with enlarged occlusal surfaces, P3 and P4 teeth with Tomes roots (indented or bifurcated), and rotated upper fourth premolars (P4 teeth). Others, such as M1-M2 or canines with "long roots," do not differ from common conditions in H. sapiens and establish no taxonomic novelty. Except for the anomalous P3 teeth (see below), mandibular bucco-lingual breadths closely replicate modern H sapiens (figure 5 in ref. 1), and data for the maxillary dentition do not differ from this assessment. Tooth size is not discordant with H sapiens, as documented in the original reports (1, 3).
LB1 has enlarged, block-like P3 teeth. These traits occur world-wide in H. sapiens (59-64), with examples similar to LB1 and LB6/1 common bilaterally. Variants similar to LB1, designated (63) as tooth shape deviations, also common bilaterally, are found in

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All followed in pairs in order fine;
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While Moths, with Ladybirds on their right
Preceded the Fireflies' lanterns br.ght.
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In cries of wonder loud;
When, cach having fairest partner found,
They all in a charming ring drew round.
They danced to the music, wild and sweet,
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And they danced while the winged hours
To where a banquet sprend

Till at length they danced, with weary feet,
Beneath a spider web awning bright
Was in truth a glad and welcome sight.
Ambrosial honey, to each one borne
By fair Moth maidens in robes of white;
And nectar, from dewy roses shorn,
Willed all--- 1.1 1.
been appointed administratrix.
MONSTER EAGLE SEIZES CHILD
Father of the Little Vletim Shoots
the Bird as It Is About
to Rise.
An eagle swooped down on a group of
children who were playing in the yard
of T. Smith, a farmer of Sheboygan
Falls. Wis.. the other day. clutched one
of the little ones in its talons and was
making off with its burden when it was
brought down by a well-directed shot
from the father of the baby, who had
been brought to the scene by the
screams of the children.
When struck the bird let its vic-
tim fall, but the child was not serious-
ly hurt.
The eagle measured 6% feet from tip
co tip of its wings.
Enilentior in
Dubuque Sunday Herald
Dubuque, Iowa
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ROSA BECKER,
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Dated January 7, 1907,
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PERA HOUSE STABLES
STEVE CURRIE, Prop.
PEN DAY AND NIGHT.

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POPULAR PRICES.
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Monthly Dividend No. 43.
FOR DECEMBER WE PAID
Kansas City,
St. Louis,
Chicago,
And all points East and South.
Only line to the famous Hot Springs
of Arkansas, the Carlsbad of
Pullman
America.
Boopers. Beclining Chair
Cars Free. For information apply to
J. O. REBER,
H. B. KOOBRA
Com Freight and
Post Ext
H. O. TOWNSEND,
Salt To City
Tray Pa. Ag
Balt Lake City.
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Stockholder's Meeting.
NOTICE IS HEREBY GIVEN THAT THE
Annial meeting of the stockholders of
the Southelde Irrigating Canal Company
will be held at the ace of the Becretary,
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SATURDAY, FEB. 13, 1901,
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MONSTER EAGLE SEIZES CHILD
Father of the Little Viatim Sheets
the Bird as It Is About
to Rise.
An eagle swooped down on a group of
children who were playing in the yard
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Falls, Wis., the other day, clutched one
of the little ones in its talons and was
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Reno Evening News
Reno, Nevada
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CORBETT TO GET BIG SHARE
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SHOT A MONSTER EAGLE.
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creasing, pule weakening and
physema has occurred butweil
brirt and Inngs, which grently
Tates his condition.
A Lafayette Township Lad Kills Big the only nourishment he can
Bird With Target Rifle
The royal physleinns hellere Thr
ment la appranching when the C
Princess Laulse, whose elopment
the French tutor, M. Rod, lic
on the Iting's aculous illuesi
come queen
BOY GRABS HER PU
Yesterday afternoon a larco, Ameri-
can uagle floated over the Peter Nies-
demus farm lo Lafayutla township.
The cagin devotel most of his time
circling around a flock of turinys in a
corn feld. Fred Nicodeinus, a fifteen-
year-old Ind, disevered the eagle and
went after bla largol rifle as
the bird
was about to carry off turkey. He
fired one shot from his small gun and LADY RODDED THIS AFTERN
it proved oectivo. 1ho largo bird
dropped deal. Its spread wings
AT TEMPLE THEATER.
measure seven and one-half feat from
specimens ever acca in Fort Way■le:
un to lin," Tl In one of the largest Chief Usher Gives Chase and
Cf Local Interest.
Mavor C. A. lonkwalter. af Imillan.
ers the Property. But Not th
Five "A Desperate Chance."
Fort Wayne News
Fort Wayne, Indian,
1-3-1903

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s fight and puts through
in charge."

: on Sibles, "if I had a
to get through I would
Hepburn In charge of it
r man in the house."
to the Fore.
TALE
consumer. The charge is made by a
number of Coshocton consumers that
in some cases only thirty-two to thirty-
five bushels are delivered to the load
when there should be forty.
the catacombs, covered MONSTER EAGLE
3 and dust, comes the
ra tidewater canal on
or Darlen route. Senator
e sole sponsor for this
he canal bill was before
d be talked about it en-
lthough with not much
scheme means a tunnet
l under a mountain. and
1 canal on the water flne.
peks and daus. probably
could be constructed If
o be taken into consider-
CAUGHT AT BLUFF
A large eagle is attractin attention
at the C. M. Hay jeweler store today.
IL was captured Dear Bluff, fifteen
miles from here, by Ed. D. Fry. It is
the largest one of its kind ever seen in
this part of the country. It measures
seven feet and one inch from tip to
tip.
ACDIDARITC
cept the plain s
wished it to be a
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Ed. Bachman.
ing with smallpo
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Dr. I. D. Seil
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James McDov
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The duties on
tina are 25 per
Coshocton Age

Coshocton, Ohio
1-27-1903

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repearing magon City House
this. mouth.
wojence and seemed to please everybody, in composition writing.
Manager Beck is booking good clear
If a man only had a ton of whale-tractions and deserves a liberal
bone he would be in luck, as it is now patronage. Remember the "Golden
selling at 91500 per ton.
Gaint Mine" will be given Feb. 5th.
The servant girls of Waterloo have A Monster Eagle Captured By
organized a union and will demand
more pay and shorter hours.
"Billy" Sunday is said to have had
516 converts la his special meetings in
Jefferson, lows, which closed last week.
Dan Easton is engaged in the real
estate business and says he is prosper-
He and family like their new
ing.
home.
Iowa has cash in its treasury to the
amount of $1,935,486.20, and of this
amount $1,190,443.06 is in the general
Dan Easton and Dan Carney,
At the home of Mable McGee on Fri-
day night the Athenian and Star liter-
ary societies will entertain the members
of the O. K. literary society.
"Lan■," mea
to the place i
& water tank
heard that t
tank at that
The fifth month examinations will be rumored thal
held at the close of next week.
factories th
were often fi
Miss MacDonald has given the follow-
The Herald of Los Angeles, Califor-ing report of her room for last month: of the visit
nia, gives a thrilling account of the
chase and capture of a monster eagle
near that city by our former towns.
men Dan Easton and Dan Carney.
The bird when discovered showed
signs of great fatigue, but put up a
plucky fight until the last when he got
tangled in the brush and the struggle
was over.
John Wade Much Better.

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No. cases tardiness.
No. neither absent nor tardy. 11
Average per cent of attendance
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ing the month:
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Willie Moon
Roberta Boggs
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Iowa Reporter
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Fig. 2. LB1 in three different views to illustrate facial asymmetry. (Left) The actual specimen. (Center) The right side doubled at the midline and mirrored. (Right)
The left side doubled and mirrored. Differences in left- and right-side facial architectures are apparent and illustrate growth abnormalities of LB1. (Original
photograph in Left is by E.I.; original photographs in Center and Right are by D.W.F.)
worldwide samples including Amerinds (59), Japanese (60), New
Guineans (61), and at 3% in a mixed Euro-African-Native
American sample (62). Overall (64), "lower premolars present wide
variation [in H. sapiens and] there is no such thing as a premolar that
is typical of its
group.
Tomes roots also are frequent in H sapiens populations (65-67)

and are part of the standard Arizona State University dental recording system (66, 67). Tomes roots in P3 teeth reach frequencies as high as 37% in non-Khoisan sub-Saharan Africans (68) and 15-25% in Sunda-Pacific populations (69). Lower frequencies (4%) are found in P4 teeth (70). Thus, Tomes roots on LBI in either P3 or P4 are completely within expectations for H. sapiens populations from the region.

It was argued (1) that the P teeth of LB1 are "unusually, rotated parallel [sic] to the tooth row, a trait that seems to be unrecorded in any other hominin." However, dental rotation is common in modern H. sapiens, typically indicating developmental abnormality, crowding, or agenesis (71). No other maxillae are known from the Liang Bua Cave sample, but it is highly unlikely that any species of Homo normatively would have bilaterally rotated upper premolars because this anomaly clearly would interfere with occlusion. In the Rampasasa sample, 13 of 50 individuals (26%) show premolar crown rotation ranging from slight to 90°. None show bilateral rotation of maxillary premolars, but a 32-year-old female has a left P^3 rotated perpendicular to the tooth row, and a 25-year-old female has a right P4 rotated almost 90° (Fig. 3). Although more work needs to be done on the etiology of dental rotations, living pygmy groups from Flores exhibit tooth rotation more commonly than other extant human populations.

Other dental traits linking LB1 to modern pygmies from the Liang Bua region include a tendency for the longitudinal fissure to shift away from the buccolingual axis on lower molars, tremata (spaces between teeth), rhomboid outlines of upper molars reflecting hypocone reduction, squared lower molar outlines related to hypoconulid loss, and large buccolingual P3 diameters. Overall, the dentition of LB1 exhibits modern human traits, with bilateral rotation of the upper fourth premolars and tooth shape deviations in lower premolars, both of which seem to occur at elevated frequencies in the Rampasasa.

Postcrania. Throughout the postcranial skeleton is evidence that contradicts any notion that LB1 is normal (see also Supporting Text). For example, the right humerus shaft of LB1 (Fig. 4) appears thick in relation to its length and epiphyseal dimensions, but the superficial appearance of robusticity is contradicted by very weakly marked muscle attachment sites. The deltoid tuberosity is poorly developed, and below it the shaft does not narrow to the usual extent. The humeral torsion angle of 110° is reported as falling

outside the 141° to 178° hominin range but corresponding to norms in Hylobates and Macaca, implying that the extent of humeral torsion reflects only phylogenetic information (3). However, torsion of the humerus is in part ontogenetic (72) and a response to the dynamic forces exerted by shoulder rotators on the growing bone. Because the lateral rotators insert within the proximal epiphysis whereas most of the medial rotators act distally on the shaft, forces working in opposite directions during development normally add 32° of secondary torsion (73, 74) characteristic of hominins. In contrast, the abnormally low amount of humeral torsion in LB1 is consistent with the extremely weak muscle development indicated

by muscle insertions.
The right ulna is missing its most distal portion. The midshaft sagittal diameter is 12 mm, the same value estimated for the partial ulna recovered from the SAS (shell and sand) member in cave 1A at Klasies River Mouth (75), with both specimens being larger in this dimension than a small San reference sample (mean 11.1 mm, n = 8) and an Australian reference sample (mean 11.6 mm, n = 4).
The holotype statement (1) describes and illustrates a "right" complete femur, but this bone is a left femur. Largely complete but for a missing lateral condyle, it has a prominent lesser trochanter with lipping in its anterior portion. The true right femur is truncated postmortem proximally by loss of the greater trochanter, most of the neck, and the entire head. Proximally, the intertrochanteric crests on the femora are highly asymmetrical (larger on right), with sizes and positions of lesser trochanters differing substantially between sides (Fig. 5). On the right, the spiral line, adductor insertions, and lateral gluteal lines converge toward the midshaft,
Fig. 3.
Partial to 90° premolar rotation is common in the Rampasasa pygmy sample from Flores. (Left) Rampasasa 041 is a 32-year-old female showing an upper left third premolar with 90° rotation, so that the buccal aspect is in the mesial position (arrow). All other teeth in both jaws are positioned normally (Right) Rampasasa 033 is a 25-year-old female with a lower right fourth premolar rotated nearly 90°, with the usual buccal aspect oriented distally here (arrow). The tooth also has an anomalous shape, resembling an upper premolar (Original photographs are by E.I.)
Jacob et al.

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clasps. Only twelve copies are known to exist, and it is believed that only twenty were printed. Four thousand pounds sterling was paid for this treasure by Herr Baer. the German book-love: seller, who purchased it on behalf of his firm. Messrs Joseph Baer & Co.. Frankfort-on-the-Main.

FOUGHT WITH MONSTER EAGLE.

Youth Battles for Life with Monarch of the Air.

News has reached here of a terribic fight C. D. Estill had a few days ago with a monster eagle near Philo, savs a dispatch from Ukiah. Cal. Estill was plowing and noticed a large bird in a tree. He stopped his work and when he saw it was an eagle he began throwing rocks at it.

The bird was hit several times and commenced circling around overhead. 100 high for Estill to throw. Estill was standing by a picket fence watching the maneuvers of the bird. when it suddenly swooped down and struck him a terrific blow with its wings. Estill grabbed a picker from the
OUL,
RACTOR, fence and then began a battle for life
ommerce
le Ave.
RN,
that eventually ended in the killing of the cagle. Time after time it came at the boy and struck him with its wings and beak, sometimes receiving blows from the picket in return. Estill succeeded in breaking one of the eagle's wings, but did not drive it away.

Both were becoming weak, and the eagle managed to stick his talons in the boy's arm, nearly tearing it from
AKER his shoulder and causing him to faint.
en.
Street.
19th Street
SBACH
IR

When he recovered the eagle was lying dead but a few feet from him. The eagle measured ten feet from tip to tip and had talons eight inches

long. Estill is still under the doc-
tor's care.

Has Potato Vine in Cellar.

When Charles H. Ballard of Oxford put his potatoes in the cella: last fall some of them got buried in the dirt. Mr. Ballard recently went into the cellar to sort over the potatoes and

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BBINO found some flourishing vines. He pull chie
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ed up some of them and found pota-
toes as large as a hen's ■gg. H■ ■&■■
the Ballard family are now eating new
potatoes and they say they are as
kod as potatoes dug in the field in
August.
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Suburbanite Econon
1-27-1905
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EVENING SESSION, 7:00 O'CLOCK.
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Address by Grand Keeper of Record The Preac
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Music, The Montpelier Quartette.
Address, "Seventy-five Thousand,
Grand Chancellor J. D. Clark, of Day-
ton.
to Be
Rev. Hi
Music, male chorus and orchestra menu in t
from Defiance lodge.
The meeting will close with a lunch-
eon.
NEARBY HAPPENINGS.
Onions Yield a Great Profit to a
Wyandot County Farmer-Big
Eagle Killed.
Ross Shafer, who resides upon the
complish-Turley farm, east of Moffit Station, shot
ions must a large eagle Saturday near his home,
criminal which had taken up its abode in a large
Any black walnut tree, overlooking the farm
ry.
uthorizes poultry yard. It was a monster bird,
each the weighing twelve pounds and measuring
trimental seven feet from tip to tip. It had been
f society, seen hovering over this section for
ls of the some days by different parties, and was
fired upon several times. The Shafers
had been losing their autumn pigs very
mysteriously for some time and it is now
suspected that this monstrous bird has
been preying upon the occupants of Mr.
Shafer's swine pens for some time past.
The bird was brought to Findlay and
will be mounted by parties versed in
taxidermy and placed upon exhibition.

It is indeed a rare bit of game for this
atur says: section and excited considerable cúrios-
city, met ity in the event of capture.-Findlay
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The record of onion raising on the big

Scioto marsh has been broken by John
B. Stambaugh of near Upper Sandusky fringed
in his shipment to New York, several
tangente
much cc
days ago, of a special consignment of
white silver skin variety, his own origin.
He put out 10 acres last season, from
which he harvested 5,600 bushels, dispo-
osene oil, sing of them at $1.10 per bushel. His The Pri
entire crop amounted to nearly 7,000
bushels. The silver skin variety netted
e oil tailed
Helm was
g in small him $616 per acre and were for a special
trade. On the ten acres planted he used
1,300 pounds of the most expensive ferti-
lizer.
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llowed, the In the Maimi County Common Pleas
elm. Her
Court a judgment of four cents was grades a
was fear-rendered for U. S. Heckman against The ne
o the top the D. & T. Traction Co. He sued for ninety-t
beard her $1,000 damages because a conductor on Indiana
shed to her the Lima Limited refused to honor a duct of
r clothing commuter ticket on that car.
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Van Wert
Daily
Bulletin
1-31-1905

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made as comfortable as
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nsom in the office was open
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not only the window, but the
he transom and door on the
ilde of the room. Glass was
all about the floor of the
out in the law library room.
dwaa aitting with
After a Monster Eagle.
Spokane, Wash., March 21.-Harry
Morse of Washtuena and a number of
ranchers of the distesouth of Spo
kabe have gone to the mountains two
miles below to capture a monster
eagle which has been causing all sorts
of havoc in that neighborhood. Those
who have seen the bird declare it has
a spread of wings measuring from U-
to 12 feet. Hundreds of shots have
been fired at the cagle, but as yet
none has hit it.
Bismark Daily
Prices ar
You
J. G. CO
Cotting
Tribune
Bismark, ND
3.22.1907

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ness, and a severe Ing meals there.
female trouble. Senor Arosemena, the Panaman min-s
Vegetable Com-
LydiaE Pinkham's later, cutered a protest at the state de-
pound has restored partment, Washington, against the
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The other a
SPORTING Tom Longboat, the and his train
AFFAIRS. great Canadian In- ford parody
diun runner, defented burlesque
me to perfect speech made in the house by Con- Alfred Shrubb, the English middle distalls, sensati
health and kept me gresanan Rainey of Illinois, in which tance champion, in their Maintho
President Obaldia was severely at-race at Madison Square Garden after
tacked.
belag nearly a mulle behind and ap
from the operating
ever be without this
house."-Mrs. SAM'L
h St., Louisville, Ky.
oration Avoided.
"I suffered untold
nale troubles, and my

freaded it almost as
peration was my only
Lydia E. Pinkham's
ound completely cured
peration."-LENA V.
A monster eagle swooped down and parently out of it. Shrubb collapsed
selred the three-year-old daughter of at the twenty-fourth mile. Time. 2
Josiab Olmtree, a farmer, near the hours 53 minutes 40 2-5 seconds.
town of Pitcairn, N. Y., but was driven
off by the child's father before It
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could By away with its intended vic.
Battered about for seventy-two
hours by terrife gales and without
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Tho subscri
TUESDA
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First Baseman Hal Chase of the
New York Aniertcan league club, who home, on-
deserted his team last year and was
suspended by the national commission, on what lau
was relustated conditional upon the all his stock.
payment of a One of $200. Jake Wel-goods, parts
Hopewell Herald
Hopewell, NJ
2-10-1909

[PAGE BREAK]

Y good garden sell is good f
so that the hogs and plas have
to charcoal and salt.
at the cow kindly You will
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dreas la a Kood Investment to
fa stock Custs no money, bat
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nt crowd the chicks to the brood-
From start to
FIGHTS BIG EAGLE USE OF PERKNIFE WINS
TO SAVE BABY BOY
ILLINOIS FARMER IN DESPERATE
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Do You Fest Like This?
To your head abe or simply feel y
SEATTLE MAN A BRIDE e De Found
CARVED HIS NAME ON WALK, BHE
SAW IT, AND GENT HIM A
POSTAL CARD.

Trenton, X. J.-Cups
bringt
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two yeang people to the a
tar was dec to a cape carved in a p
villon on the board walk in Cape May
and to a penny souvenir postal card.
The principals In this little romance
labeblekens STRUGGLE LASTS TWO HOURS are as Anta Clark, whose home is
or do well when crowded
commodious tool shed is as equip
which very farm should hav
which in too many cata la ab
ck up around the place this year
az it the neighbors dea't catch
A good example goes a
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ead the oals out on the bar for
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vel together Into a ple and cover
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Glant Bind's Wings Ars Broken and
It Is Finally Overcome with
Help of Neighbore-Meas
ures Twelve Fort
near Lawrenceville, and Joseph
das, a ecatractor of Beattle, Wash
They were weddrd-kere the other day.
In 1907 Mr Brodes visited the Jer
pey amber resort. While sitting a
a pavillea ca the board walk one after
oo be carred his name with
St. Charles, Il-Fighting desperate hea of the structure. A
few weeks later Miss Clark spent a va
ly for two hours with a monster vacation in Cape May, and while with a
to keep a baby from the menacing
talons of the great bird, Peter John-
sea, a farmer, with the aid of neigh-
bors, faally captered the king ct the
air.
Fully a socre of persons participated

In the contet with the eagle. and
pitchforks, clubs and staxes were
breaths late mrvice before the bird.
exhausted from his Corts go up
The battla. Johnson was terribly
scratched la the caconter, although
his on WAS onhart
The Johnson boy, a sturdy child of
three years, was playing on his fa
ther's farm near St. Charles the other
morning when the eagle was ist eb
BATTEd.
The great bird etreled about the
cinity at a great belebt for avaral
malnutes. Buddenly, with the speed of
lightning flash. It darted down, ap1
steel-ke tales caught in the
child's dress.
The child's surprise for a secood
atrack him cumh, and the eagle calar |
STET DURce of its arrength, bore the
boy upward. Surprise cave way to
alarm. The child screamed for and
and strugated varanty to free bia
self from as cagla's etute
rezz
His Name Carved in the Board Walk
Resulted in a wedding.
The boy is a stockily balle lad
welgting about 3 pounds, and the crowd of girls caled the name, "Jo
bird was unable to make great proseph Drodus. Scale, Wash ta the
pavilion. Che called to attention of
The father beard the screams of hla her companions to the aama and some
child and turned from a boca, Heone sugated, in jest, that the owner
saw the bay in the bird's clutches
and ran toward the serne of the sum
Ele
With all his strength he threw him
l! on the eagle and bora it to
He Throw Himself Upon the Eagle.
re
of the same would be surprised if he
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to Miss Clark and that night Uncle
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ber a month afterwards, bac was viv
Ally recalled to bermetery when she
received a letter from Mr. Brodar The
Jetter thanked the sender of the postal
for calling the writer's attention to his
boylabness and explained the cream
stances
Ahbourb realizing I was conven-
tlocal, Mate Clark could not resist the
temptation to answer the letter, apolo
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ho convinced Miss Car's that
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locked in a death grip, the eacle us ship which spreag en between the two
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your wife mbea you get bonaT
Job don't aw: I don't
pors who wold be love me if I should
tell her that I had brea to a fish dip
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Ask Your Dresset for Allen's Food
1 tried ALLENS FOOT-HASE recent
17. and have just bought either supply
It has cared my corn and the rot, OTA-
Lag and hiching senation in my feet which
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at last was almost helpless. I tri
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Vegetable Compound, and it has
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Since we guarantee that all
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Moving Picture

lug his claws, whio Johnson struck ripened lato a deeper affection, and Invest Your Money In Moving!
out with Lis free hand as he held the sennd visit of tto Eeattle man last
Mrd with the other.
Neighbors were soon on the scene.

September remited to the ca
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1r po to capture the enge alle. would resalt from the sending of that
Sticks and stones fell on the monster portal," raid the tride
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The breaking of the wiss mate ca DIGS 10 MILES THROUGH SNOW
cape of the cagle impossible, but for
Prospector Reaches City
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ground. Bercely repelling every attack,
at completely exhausted, be was
palmand to the earth by two pitch
forks,
Dead Than Alive.
Buena Vista, Col-Almost Cand
from sheer exhaustion and starvation)
ta battlag with the heroe stements.
Samuel Deuny, an old prospectar,
The age when measured proved to
be 12 feet from lip to Un et bla wa
and a perfect specimen of its kind It
la belleved be will speedily recover a near the bead of Cottonwood cam,
west of Buena Vista, who bad beca
from Loo fries a is struggle with
the men, and Johnson plans to preacat snowbound for over 30 days, stumbled
Into the Hotel Boens Vista at Ect
It to me mological garden
Although Johnson is suffering in-orig. tx miles west of Baran
tease pain as a recat of the scratches Vista, after a trip of four days, euVIP
received to the ght, rae of his hartstag distacce of over tan lles fro
his lamely cabin ta the momtatas to
is regarded as tangerona, the warGE
pf
wound being a gasb tora in
is left shoulder. He was greatly weak-
ened from lots of blood.
Denny would abaval cat a trail for a
distance and thea retera to ble cabla
for rest and food. Agata to would
The boy is none the worse for his tackle the drifting sow, comme
experience and takes great delight in stoveling thmagh drifts and
watching be imprisoned bird.
Celd Dip Reatores Girl's Voice.
fest deep. In this manner and in co-
Blant danger of being engulfed in
snowslides which may times blocked
Los Angeles, Ca- Berlee the trail behind him, he Bally reached
Pooler, valor from Phandeph's too apris, more dead than alle
Desay thes at the bead ot Cotton-

ard deaf-mute since babyhood, re
calmed her speech and bearing, fallow woot pass where he has located a
inga endden place in the Paclac ranch and has a number of cattle, all
of which to trys will die. He tas al-
ocean at Ealboa beach
ready lost four from hunger and celd
He was compelled to coastsatly shovel
so the carte could get water to
The bath was ta voluntary. She lost
a pair of valuable gold combs and
diamond pt beiden retting a rhoek
ard ruintog ber gawa-but she asya 11
was worth 12
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This Sally overcame the man, who
a nearly 13 years of aze. and, ecelag
12at he could pot are the rest of his
cattle without trip, aa nadiag his
Mi Pacter lost her speech and
hearing by falling into a lebe to Peas
sylvania when she was an Infant, 19
years ago, and bes not heard a round provisions raasing low, he started for
or woken word since. To-day abe the nearest place, Buena Vista Hot
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STRUGGLE LASTS TWO HOURS are Miss Ani
Glant Bird's Wings Are Broken and
It Is Finally Overcome with
Help of Neighbors-Meas
urca Twelve Feet.
St. Charles, 111.-Fighting desperate
oes a ly for two hours with a monster eagle
to keep his baby from the menacing
talons of the great bird, Peter John-
areful son, a farmer, with the aid of neigh-
bors, finally captured the king of the
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1er.
Fully a score of persons participated in the conflict with the eagle, and pitchforks, clubs and stones were brought into service before the bird, exhausted from his efforts, gave up the battlo. Johnsan was terribly scratched in the encounter, although his son was unhurt.
The Johnson boy, a sturdy chlid of three years, was playing on his ta-ther's farm near St. Charles the other morning when the eagle was first ob-served.
The great bird circled about the -short
ae old clalty at a great height for several kero- minutes. Suddenly, with the speed of a lightning flash, it Jarted down, and rest to
their its steel-like talons caught in the child's dress.
The calld's surprise for a second
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t trees struck him dumb, and the eagle, using | avail- every ounce of its strength, bore the rovide boy upward. Surprise gave way to d, but alarm. The child screamed for aid provo and struggled vigorously to free him-self from the eagle's clutches.
The boy is stockily bullt lad, welghing about 35 pounds, and the crowd of gli bird was unable to make great proseph Brodus pavilion. S

The father heard the screams of his her compani
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Fig. 4.
Anterior aspect of the humerus Note near absence of deltoid tuberosity as well as minimal difference in subdeltoid and supradaltoid width of the shaft. These indicators of extremely weak muscle development are consistent developmentally with an abnormally low degree of humeral torsion.
where they run parallel for only 30 mm before dividing again into borders of the popliteal surface. These lines are barely visible, even in the middle of the shaft, unlike a normally robust and prominent linea aspera. The arrangement of muscle attachments is similar on the shaft of the left femur, but lines are not visible distally. Such atypical features imply severe muscle hypotonia (paresis) during life, associated with complications of abnormal growth.
Right and left patellae are completely preserved, and like the femora show asymmetry, with the left patella 10% longer su-
Fig. 5.
LB1 femora. (A) Lateral views of both femora, showing antimeric contrasts in diameters as well as sizes and orientations of lesser trochanters. Note thin cortex in the small postmortem break on shaft of left femur (B) Posterior aspect of both femora. Note shortness of linea aspera and large size

of popliteal areas.
Jacob ot al
Fig. 6. CT scans of LB1 leg bones (vertical scales are subdivided into 10-mm units). (Top) Longitudinal scan of the left femur (up, anterior). (Middle) Midshaft cross-section of left (Left) and right (Right) femora (in all cross-sections, down is anterior). Note differences in cross-sectional outlines and internal structures, indicative of same evident left-right asymmetry also seen in Fig. 5. (Bottom Left) Cross-section of left tibia at level of tibial tuberosity. (Right) Cross-section of left tibia at midshaft. Note that cortical bone (completely radio-opaque area) in all sections is only -2 mm thick, abnormal for an adult primate of either sex, and body length >1 m.
peroinferiorly. The right tibia is complete, except for the medial malleolus and the area immediately proximal, whereas the left tibia lacks both proximal epiphysis and medial malleolus. Tibial shafts are oval in cross-section rather than approximately triangular (see Supporting Text), an unusual feature suggesting compromise between the need to support and move body mass and generally weak muscle development.
Repeated statements that the long bones are "robust" reflect the observation that they are large in diameter and circumference proportionate to their length, but also imply that they are massive and strongly developed (see also Supporting Text). Ratios of shaft circumference to LB1 maximum long bone lengths do seem unusually large. For the left femur it is 38.4%, whereas in our modern Indonesian reference skeleton and the LB78 femur excavated in upper layers of Liang Bua, the values are 26.6%. Similarly, the ratio for the right humerus is 30.9%, against the normal adult Indonesian reference specimen's 24.8%. The ratio for the LB1 tibia is 29%. However, CT scans of diaphyses show thin (~2 mm) cortical bone and very large marrow cavities (Fig. 6), providing further evidence that shafts of long bones of LB1 are abnormal (16). Inflated circumferences, combined with very thin cortical bone showing very weak muscle markings, indicate not robusticity, but long bone overtubulation indicative of disordered growth.
Additional postcrania (3) generally are consistent with inferences that the Liang Bua Cave population was small-bodied. However, the most recently described material does introduce some additional conundrums. For example, the LB8 tibia, with an estimated length of 216 mm, is used to reconstruct a stature of 1.09 m, greater than that of LB1 at 1.06 m, although LB1 tibia length is 235 mm. Importantly, none of the newly described postcranial bones (3) nor LB6/1 indicate anything about the neurocranial dimensions of individuals from which they were sampled.

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He, Threw Himself Upon the Eagle.
Then ground. The child was saved and ran
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Neighbors were soon on the scene.
From the start they were determined,
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Sticks and stones fell on his monster
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cape of the eagle impossible, but for
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hours he fluttered along the Colorado
ground, fiercely repelling every attack
until. completely exhausted, ho was
pintoned to the earth by two pitch-

forks.
The eagle when measured proved to
be 13 feet from tip to Un of his wings
and a perfect specimen of its kind. It
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produc from the injuries in its struggle with
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is rogarded as dangerous, the worst
wound being an immense gash torn in
his left shoulder. He was greatly weak-
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The boy is none the worse for his
experience and takes great delight in
watching the imprisoned bird.
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AS PNAS
.scussion
Our reexamination of the original skeletal material shows that there is insufficient morphological or metric evidence for a new hominin species on Flores, where evolution over millennia in total isolation is unproved, unlikely, and at variance with Stegodon migrations and glacial geology. The skeletal material excavated from the Liang Bua Cave represents individuals sharing small body size, although unlikely as diminutive as proposed, plus some dental and other traits previously documented. Such commonalities are expected on grounds of shared environment and relationship in a local group, as are variations due to age, sex, microevolutionary trends, and other intraspecific factors. Against this background, rather than exhibiting "a mosaic of primitive, unique and derived features not recorded for any other hominin" (1), the LB1 individual exhibits a combination of characters that are not primitive but instead regional, not unique but found in other modern human populations, particularly some still living on Flores, and not derived but strikingly disordered developmentally.

Materials and Methods

Standard osteometric instruments were used for skeletal measurements, and a whole-body scanner (Toshiba, Tokyo, Japan) at the Bethesda Hospital in Yogyakarta (Indonesia) was used for CT scans. During our study of the bones at the Laboratory of Bioanthropology and Palacoanthropology at Gadjah Mada University

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(Yogyakarta, Indonesia), direct comparisons of their size and morphology were made with an adult male Indonesian reference skeleton (in vivo stature 1.55 m), supplemented with published data on skeletal variation, particularly human skeletons excavated earlier on Flores (38) and in Australomelanesians (39-41). In April, 2005, a team led by T.J. studied Rampasasa pygmies in Waemulu village, 1 km from Liang Bua Cave.

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Jacob et al

[PAGE BREAK]

aakes the handling of the milk and
ream eusler, but gives you Sweet
allk to feed to the bogs.
Garden all planned for? Surely you
re not going to let another Beuson
ass without that promised luxury. It
is a lilllo work, but you will be more
han repaid next summer when you
re enjoying the fresh things you can
Tow on the little patch near the
ouse.
The surest method of killing all ver-
nino and disease germs in the chicken
house is to fumigato by burning sul-
hur. No living germ or animal can
xist la the presence of sulphurous
cid gas. It finds its way into every
rack of the room and makes completo
testruction in its path. When fumi-
juling, remove all of the fowls, mako
he room perfectly tight, and bura the
alphar with Ilve coals or on a redhot
shovel.
Treat the seed aats If there is any
langer of smut. Get a half pound of;
A 30 allons of water.
you in the habit of leaving your name
behind you in every place you visit?
I suppose you want Cape May folks to
remember you." Miss Clark not only
signed the card, but gave her home
address.
The incident bad been forgotten by
ber a month afterwards, but was viv.
1dly recalled to her memory when she
received a letter from Mr. Brodus. The
letter thanked the sender of the postal
for calling the writer's attention to his
boyishness and explained the circum.
stances.
Although realizing it was u■conven-
flonal, Miss Clark could not resist the
temptation to answer the letter, apolo
gizing for her boldness in addressing a
This missive was
stranger.
unan-
swered and the romance was not like
others, Inasmuch as there was no long

distance love-making before the prin-
cipals met.
Cupid prompted Mr. Brodus to make
another trip east last summer, and he
went to the home of Miss Clark, where
he introduced himself, While sur
prised, the girl received him. He
learned that several old friends of bis
benefit of this valuable remedy.
"I suffered from pains in my back and side, sicl
no appetite, was tired and nervous all the time, a
could hardly stand. Lydia E. Pinkham's Vegetabl
made me a well woman-and this valuable 1
always have my praise."-Mrs. W. P. Valentine,
Ave., Camden, N. J.
Erie, Pa. "I suffered for five years from female'
at last was almost helpless. I tried threo doctors
me no good. My slater advised me to try Lydla I
Vegetable Compound, and it has made me well a
hope all suffering women will just give Lydla E
Vegetable Compound a trial, for it is worth its wei
-Mrs. J. P. Endlich, R. F. D. 7, Erle, Pa.
Since we guarantee that all testimonials wh
lish are genuine, is it not fair to suppose that
Pinkham's Vegetable Compound had the vit
these women it will help any other woman w
ing from the same trouble.
For 30 years Lydia E. Pinkham's Vegetable
Compound has been the standard remedy for
female ilis. No sick woman does justice to
herself who will not try this famous medicine.
Made exclusively from roots and herbs, and
has thousands of cures to its credit.
If the slightest trouble appears which
you do not understand, write to Mrs.
Com has odvina-itia

[PAGE BREAK]

HIRE
ents
ints
ents
D
or sugges-
spo
t
Reese.
Reese Brothers did difficult acts in;
gun spioning and
acrobatic work.
They were well received
Wille Nowal, the boy singer, has a

good voice and sang two selections.
"Southland," a comedy musical
sketch made a bit, and many catchy
songs by Miss Jesse Nickens, won (a
Many dances were also intro
for.
duced.
Tonight and Saturday night, from
reports heard after last night's per-
formance, good houses are predicted.
Tonight a change of program will
be made. The prices remain the
same, 10, 21 and 30 cents.
king. Then the plot thickens.
Ine nisical numbers in the "isle
of Spice" have become famous and
include "The Goo Goo Man." "Peggy
Brady," "Silly Sailors," "You and I."
Flight of Monster Eagle Noted.
A monster eagle with white head
and tall is reported as flying over the
lower Kennebec. The big fellow seems
to bave his home in Arrowslc-Bos-
ton Globe.
Best Milk for Bables.
Morning milk is best for babies-
fresher and fewer germs than the
previous night's milk, but slightly.
weaker in cream.
Mr. Ell Underwood
list.
Burly Frye is very i
on Nellie Route 2, with
Mr. Emmett Frye o
visiting his parents
Standen Frye.
Farmers are busy c
Mr. James Hughes
sale Oct. 4, and he w
Wisconsin to make his
FELT THE HOME !
Pecullar Piece of Valu:
Excited the Envy
Editor.
Coshocton Daily Tribune
Coshocton, oh:0
9-24-1909

[PAGE BREAK]

Roospaper and a bill to a man that's
dead. It's your affair, not mine.
"Well," said the editor finally, per-

iving that he must be a loser, "in
gre, madam, I will cause an extra
to be printed on asbestos to in-
that your husband receives his
on regularly."
Flight of Monster Eagle Noted,
A monster eagle with white head
e tail is reported as flying over the
wer Kennebec. The big fellow seeme
have his home in ASTOwsic.-Bo
Hobe
Old Soldier Suicides.
Washington, Oct. 6.-Wandering to
a lonely spot in a wood within the
grounds of the government hospita'
for the Insane here, William Ohle. 63
veteran soldier and an inmate of the
Institution, committed suicide by hang
ing himself.
Pioneer Oil Man Dead.
New York. Oct. 6.-Samuel Q
Brown, one of the pioneer oil men of
the United States, Is dead at his home
here of diseases incidental to old age
He was 74 years old.
The Season
Red and Black Top Jockey Boots
American Boy Elk Skin for
Tan Lace and Dull High Cut But
Cocoa Brown High Cut Lace fo
SEE OUR WINDOWS
WALKER&LAW
We carry the largest line of High. (Cut
Shows Thursday
Coshocton Daily Tribune
Coshocton, Ohio
10-6·1909

[PAGE BREAK]

e various organizatious of
lubs, socletles, etc., and
is daily receiving petitions
ers strongly protesting
In a largely Increased acreage of cane [1sguises.
next year. He is also shipping small-
er lots to California and Michigan.
Hunter Kills Big Engle.
But "capuchon" is the term by
which we will know it.
It is. the same which the powdered
cauty of the Bath chair was wont to
wear.

e Imprisonment of the wo- Sim Morce, who lives about ten
me of these letters are miles north of Columbia has added In nearly all cases it has a loop-like
n terms of much Indigna- another valuable trophy to his col-frame which will allow the display
what the writers term "an lection of game. This time it is a of the hair ornament.
the largest
It is always very roomy in the back,
10 as to accommodate the largest of
English buns and Grecian curls.
a "travesty on justice" and monster cagle, one of
h to the manhood of the ever seen in this State, and the first
One killed in this section for several
man was indicted for bur- years. The eagle measures six feet.
evidence showing that she five inches from wing tip to tip and
in into a house and stolen has a claw eight inches across, while
5 and a few other articles his leg. between the knee and claw, Place with a bow of ribbon.
o keep herself and a dis-measures one inch in diameter. Somo
her from starvation. It is time ago Mr. Morec, with others,
hat the value of the art-cleaned out a den of wolves in that
the extenuating
The plainest of the. "capuchons"
tre made of lace or chiffon, caught
with a cluster of roses or held in
But many of the most beautiful of
these hoods are of taffeta bewitch-
Ingly arranged around the face with
chirrings and ruchings.
circum-section. There were several wolves At any rate, the girl or 'matron
d not warrant the disgrace in the pack. and they had been kill-who wants to be effective will not dis-
hnent imposed.
ing chickens, small stock and other regard the opportunity afforded by
this glorified evening sunbonnet
which, hails from Paris.-Pittsburg
Disnatch
nry Year in Assessments.
apletion of the assessments
animals.
Will Cash Pension Warrants.
2334
10 Wear
Also
depen
which
The days of the black and white. at too
hat are numbered.
The scarab again has a prominent
place in jewelry.
The wired net' bow as a hat trim-
ming is revived again.
Lynx is very scarce and is gener-
ally replaced by black fox.
Picture effects abound in outer cov-
erings for handsome toilets.
aro hi

work
specle
and c
those
Ing.-
137
Pic:
thresh
The new greens are the most vivid acres
that fashion has ever known.
It be t
separ■
Nowest skirts show a combination
of the popular princess panel and the usual
new fashionable pleats.
Jet embroideries are used as a
trimming on pale-colored satin as well
as on all black foundations.
Among the colors that will be
much worn are the blues, pink, brown
Ang
with
put Ir
It sho
damp
Tt (1
Laurel Ledger
Laurel, Mississippi
12.2-1909

[PAGE BREAK]

drain Mr. Heinz claimed that Officer
(yilro
larger
spied.
nilure
eturn
red at
ential.
day
gical
UE
I'feffer choked her when she remion-
strated with him for arresting hor
boy.
The court room was crowded all day
with a curious throng of anxious peo
ple who were Interested in the cusc.
Twenty-three witnesses were exum-
Ined. The testimony throughout was
rather Interesting.
Olleer Pfeffer denled that he choked

31ra. Ielnz. He testified that he wa
arresting her boy for fighting and sho
Ises Interfered and tried to prevent him
from doing his duty. He pushed her
le, he said, but didn't harm her.
Mrs. Heinz textiled that tho ollicer
choked and abused her.
Arca
aque,
have
our
Izena
Attorney Kintzinger appeared for the
uqua defendant and told the court a police-
man's dutlen nnd rights.
QUD
..
Elv-
Oleer I'feffer was suspended from
duty by Mayor Berg when the charges
were preferred against him. The
mayor deelded to abide by the de-
clsion of the court in dealing with the
olleer und since Squire Kessler de-
unl elded in favor of the ofllcers the latter
will be reinstated.
Aro
H.
And
that
40.
10.
Justice Kessler was very patient and
Kave both aldes full opportunity to
produce their evidence. Mrs. Heinz und
my her family swore poultively lo tho
have charge, but neighbors and others who
ling. witnessed the affair did not Bub-
stantiate her. Beveral who saw the
hoir
whole affair testifled that Mrs., Heinz
MAYO
hung on to her boy and that the ollicer
R.
only pushed her nway. The physician
vero testified thero was a red mark on her
Jaln
throat and that he found her very
rood nervous. Witnesses testifled she was
Y.
xubject to fuinting fits that left her
nervous. Dr. Holland examined Mrs.
Heinz and testifled he found no marks

of violence on her. Justice Kessler, after hearing att the testimony, decided the prosecutor had falled to prove her charges und he dismissed tho cane. put This Is considered a vindication of the oficer.
R.
was
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t In
R.
hom
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L.

FIGHT WITH AN EAGLE
Coorgo Perry Bas an Rxelling
To try to get along without Wolsbach lights Is like trying to get along without railroads.
The person who does not use Welsbachs because somebody told him they were expensive, ought not to bolleve the world la round because the ancients sald it was not
It is the cheapest means of illuminallon you can get-for your store, the hall, or the dwelling.
Cheaper than electricity besides giving four times the light.
We can Instal Welsbachs anywhere and will give you estimates at any time.
KEY CITY GAS CO.,
600 Atain Street.

driven here by the severe storm of Friday night.
P
not
J. B. Sumpley of the Postal Telegraph company, In discussing r Perry's fight with the engle. said he had some kind of an Iden of the nature of the contest by a similar experi
perience he had in Kansas
low
years ago. He was attending school at Wichita and occasionally went out hunting. He had a sister living the country and one day started out with a new gun ho had just purchased in quest of game. He had not

proceeded far until he espled a Rocky Mountain eagle perched on the side of strny stuck. He made a detour of the stack and was close to the bird before discovered. He fired at the eagle and broke one of its wings. The bird Immediately attacked Mr. Sampley and he says the night wan one of the most Interesting encountera he ever witnessed. The bir! would strike him with Its ponderous wings and claw him with its long and sharp tulons. At first he tried to strangle the engle by catching hold of Its thront, but the bird skillfully avolded his rushes. Mr. Sampley, neeing that he was getting by far the worst of the night, commenced strikIng at the engle with his gun stock He soon broke the gun to pleces, but x-disabled the engle and marched triumphantly home with it. Mr. Sanipley sald the bird stood about four feet high and weighed nearly fifty pounds. He carried it half a mile and was compelled to rest frequently. This goes to prove how dangerous pororlenco on Bouver Island.

Clinton Herald: Saturday evening George Perry, a fisherman, who realdes on Beaver island, was exhibitIng on the streets here n monster eagle, which he had shot on the lu land In the afternoon.

Mr. Perry stated to a Herald reporter that ho succeeded in killing the bird after a hard and exciting fight. Io uuld he first noticed the engle in the tops of some trees near ping eagerly vory at hls house. The bird was looking fat poultry In somo his yard. He took down his double barrel shot gun, slipped out of the house und frud al tho cagle, clightly wounding it. Before the smoke bad cleared away, the bird was upon him

on boating a lively tatoo with its wingu
and scratching him with its long tn-
lons and striking him with its beak.
It was some Ume before Mr. ePrry
could recover from the unexpected
and viclous assault of the 'engle and
he was considerably scratched and
bruised before he succeeded in dis-
patching the bird with the contents
of the other barrel.
AB7
ROD
ative
• of
S
The caglo Is what Is called the
American brown eagle. It measured
six feet and a half from tip to tip.
and weighed about thirty-five pounds.
Ita talons wero two inches in length
and between the kneo nnd foot, the
lega were an inch in diamoter.
a combatant one of these cagles are.
WEST VIRGINIA
C
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Republican Convention to Nominate L
Staro Omeer.
Charleston, W. V., July 10.-There
are many lenders and delegates here
for the republican state convention
which convenes in this city tomor-
row afternoon. Hon. A. B. White, of
Parkersburg. seems to hava no op-
position for the nomination for gover-
nor. Senator Elkins, who is to be the
temporary chairman of the conven-
tlon arrived today and conferred
D
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h
with many candlates for members of
the legislature. The legislature that
Is selected this year clects the suic-
cessor of Elkins in the senate. Gov-K
ornor Atkinson, Congressman Freer, 21
and State Treasurer Kendall are can-
diates for permanent chairman.
OFFICER KILLED
W
n

11
b
W
Glencoe, O. T., July 10.-The mar-
shal of Glencoo was killed last night
and three desperadoes wero mortally
wounded in 2 battlo twenty miles
cast of here. The marshal was en- 01
It is supposed that the bird was denvoring to arrest the outlaws.
S
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urer
ng
ying
isen.
en,
SPECIAL
SHOE OFFERINGS!
We expect to make this week a rec-
ord-breaker if low prices and serviceable
footwear will do it.
Ladles' fine Kid Lace Shoes $150
at
Six new styles of Ladles' Fine Kid
Laco Shoou, Black or Tan, heavy cr
light soles-
our special prica
[AD] $200
Boven now stylen of Ladies' Fine
Boys' Knock about school shoes,
Black or Tan, good nitters, styllab
and honestly made-
for $1.00 and.
[AD] $150
One tot of Ladies' Kid Oxford Tles,
which we want to close out In
Black or Tan-a collection of $1.25
and $1.50 Slippers to close out
for $1.75 and
out 75c
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Dubuque Daily Herald

Dubuque, Iowa
7-11-1910

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OPEN ACCESS Freely available online
Feature
What Is the Hobbit?
Tabitha M. Powledge
ho-or what-is Homo floresiensis? The tiny hominid bones, which a joint Australian-Indonesian team unearthed in 2003 on the Indonesian island of Flores, have quickly become as celebrated (and derided) as any find in the tempestuous history of human paleontology. The mystery that shrouds these ancient skeletons, nicknamed hobbits after the diminutive characters in J. R. R. Tolkien's novels, seems to deepen with every study published. Two main camps have emerged, each certain they can settle the question. But many other paleoanthropologists confess they still have no idea.
H. floresiensis Discovered
The discovery team declared their find a new human species, H. floresiensis, based primarily on a single near-complete skeleton of one very small individual with a very small brain, known as LB1. Compared to H. sapiens, LB1, whose age was estimated from tooth wear at about 30 years, was only one meter tall-about the size of a 4-year-old H. sapiens child-with a brain the size of a newborn's. Although there are also fragments of eight other small individuals, they provide no information about brain size, nor is much skeleton preserved. Nonetheless, they possess a combination of features never before seen in human fossils, which makes it credible that a previously unknown population of people smaller than today's pygmies lived on Flores between 90,000 and 12,000 years ago.
H. floresiensis...could be the first human example of island dwarfing.
Stone tools found at the site raise the possibility that hobbits had culture, even though LBI's brain size would make a chimpanzee sneer. H. floresiensis, the discovery team claimed, could be the first human example of island dwarfing. This phenomenon, thought to be evolution's response to limited resources, is known for other mammals, including dwarf elephants from Flores itself. But this is not the only possible conclusion. A long-awaited paper, which appeared online in Proceedings of the National Academies of Sciences of the United States of America (PNAS) on August 23, 2006, offers a radically different interpretation of these skeletal remains.
H. floriensis Disputed
The lead author of the PNAS paper is Teuku Jacob, the "Grand Old Man" of Indonesian paleoanthropology. Jacob was not a member of the discovery team, but his lab at Gadjah Mada University in Yogyakarta on Java is home to

many hominid fossils discovered in the region. For reasons still unclear, soon after the journal Nature published the discovery papers in October 2004, the hobbit bones were conveyed to Jacob's lab from the Center for Archaeology in Jakarta, about 450 kilometers away.

The result was an international uproar played out in the media. Australian members of the discovery team were irate

[AD] DOI 10.1371/journal.pbio.0040440.9001

Figure 1. Three Faces of LB1

PLOS BIOLOGY

The image on the left shows LB1's actual skull. The other two photos are composites made by dividing right and left sides at the midline and mirroring each side to yield two photos displaying obvious differences in right and left side facial architecture.

(Photo left: Etty Indriati Photos center and right: DW Frayer Courtesy of Proceedings of the National Academy of Sciences of the United States of America, used with permission.)

because their finds were moved without their permission and were no longer available for study. Other paleontologists expressed alarm at what seemed like one group of scientists making off with finds of another. Jacob said he had been invited to take them.

Moreover, Jacob pronounced that the bones did not belong to a new hominid species, but were those of H. sapiens after all. How to account, then, for the diminutive size of LB1 Jacob concluded that LB1 suffered from microcephaly, a disorder resulting in abnormal development of the brain and, often, body. His diagnosis was backed by Indonesian colleagues and also a few Australian and American researchers whom he permitted to study the bones.

After complex negotiations, most of the bones were returned to Jakarta in February 2005. But the uproar revived when discovery team member Michael Morwood of the University of New England (Armidale, Australia) protested that LBI's pelvis was smashed and another hobbit's jaw was broken and repaired clumsily. Jacob responded that the bones were fine when they left his lab

When the criticisms of Jacob and his collaborators were finally published in August 2006, they reiterated previous claims that the LBI skull was unnaturally asymmetrical, showing signs of deformity. The paper also reported that many LB1 traits resemble those of Austromelanesians, and some are similar to Rampasasa pygmics living near the dig site at Liang Bua cave. Hobbits are probably related to them, the authors said, and therefore not a new species. Moreover,

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DOI: 10.1371/journal.pbio.0040440

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original author and source are credited
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December 2006 | Volume 4 | Issue 12 | e440

[PAGE BREAK]

GRASS GIRLS AVIATOR IS ATTACKED
) SHOT TO KILL
NG DAUGHTERS OF KEN.
'MOONSHINER ROUT
REVENUE POSSE
BY A FURIOUS EACLE
M. GILBERT SHOOTS DIRD THAT
REPEATEDLY SWOOPS DOWN'
ON THROBBING MACHINE.
Alsasqua Spalo.-Aviator Gubert,
after a battle with an eagle
helght of four thousand feet,
here second in the Paris-Madrid race
MARSHAL IS KILLED for $20,000.
ged Fifteen and Eighteen,
ed in Their Mountain Home,
tadly Battle-A Tragedy of
itucky Wild.
Ky. After a 50-mile ride
Centucky mountains, now
inding a stream swollen by
shets, the correspondeut
ng the towering pines about
creek the Tackitt sisters,
ed eighteen, and Fannie,
a, who recently gave battle
of revenue officers, killed
ded another and put the
iles deputy marsbal iD
o fight.
ade mound in the village
round marks the place
Charlle Smith, deputy mar-
a bullet still embedded in
B of his heart. The sisters
1 with killing him. Ono or
it but they declare they
efense of their aged moth-
¡mith bad shot and beaten
evolver when a raid was
eir still in the mountains
int.
nostrils bad scented stew.
in the mountains back of
which corn was being
Into whisky in violation

eeren pages of goverp
tes. Of course it had to
The task waD BESigned to
shal J. Matt Potter, one of
ofdcers In the south. For
3 be has been in the serv-
le Sam, and more than
Ebot off moonshipers who
n. He picked Levl Small-
Charlie Smith for such
ort and physical participa-
occasions might require.
pt up the guich and came
ntainside clearing at mid-
e the Tackitts knew what
lug the son of the family
bandcuffed and placed on
easy capuve. This was
gloning of the fight.
orge Tackitt, bead of the
away from home. This

In his flight over the Cantabrian mountains, while roaring at a lofty height, a monster gray eagle attacked Gilbert, swooping down on the aero plane and beating the aviator with beak and talona.

Gilbert's aeroplane required all ht attention because of treacherous air currents over the mountains. The ma-

Eagle Attacks Aviator.

chine was at a belght of 4,000 feet, with the country lying dim beneath. Tho great bird circled round andi round the aeroplane, evidently think-ing It a new and monster member of the bird family. Finally Gilbert man-aged to draw his revolver and fired, two ehots at the eagle, driving it of.. When the aviator landed here he de-clared the aerial battle with the glant; bird had given him the most exciting moments of his career.

At one time the eagle attacked blmi to fiercely, he said, that the aviator. had to take his hands off the levers and momentarily lost control of the, machine. It was at this time that the Intrepid airman drew his revolver.. The first shot weat wild, but fright-ened the bird, and the second struck! it. Gilbert rogained control of bis. machine just in time to keep it from,

crasbing to the ground.
NAILS TALKING GIRL TO CHAIR
Unusual Kind of Assault and Battery.
Charged Against New
Jersey Man,
New York John Eddings, the odd.
jobs man of Prospect Park borough..
N. J., Is awaiting trial on a charge of
assault and battery, but it la such an.
She boy gan
·Daily Press
6-30-1911
wis consin

[PAGE BREAK]

AVIATOR IS ATTACKED
receniceBLUE GRASS GIRLS BY FURIOUS EAGLE
Billy Boy
By MAITLAND L. OSBORNE
on the garden 'steps ua) bad once patronizingly addressed
ratched Belshazzar's him as "my little man," and Billy de-
to dig out a mole. tested him accordingly.
Billy would have sec- "I'll punch him," reflected Billy
r's efforts but today aloud, vindictively.
WHO SHOT TO KILL
TWO YOUNG DAUGHTERS OF KEN.
TUCKY MOONSHINER ROUT
A REVENUE POSSE
A
M. GILBERT SHOOTS BIRD THAT
REPEATEDLY SWOOPS-DOWN
ON THROBBING MACHINE
Alsasqua, Spain-Aviator Gilbert,
after a battle with an eagle A
height of four thousand feet, landed
bere second in the Paris-Madrid race
DEPUTY MARSHAL IS KILLED for $20.000.
have turned his head "Who-what?" asked Uncle Jack Slaters, Aged Fifteen and Eighteen,
parade. The somber
Er desolation had set-
startled.
"Mr. Stanhope," explained Billy. "I
und life, which once, saw Bessie's aunt out riding with bim
ur, mocked him with in his auto."
Surprised in Their Mountain Home,
Give Deadly Battle-A Tragedy of
the Kentucky Wild
Uncle Jack stared. Then he laughed..
in love, and his love "Well you are an observant little
Sergent, Ky-After a 50-mile ride
inted, derided and re- beggar," he conceded admiringly into the Kentucky mountains, Dow
lly's age such things "Though that isn't the root of the and then anding a stream swollen by

had struck deep into dimculty, Billy Boy. Mr. Stanhope is spring freshets, the correspondent
ten off, and the barbs merely an accessory after the fact-found among the towering pines about
non particeps criminis, as it were." Long Fork creek the Tackitt sisters,
iched the epochal age This being too deep for Bill; 's com- Bettie, aged eighteen, and Fannie
aining the grand pas- prebension, he Ignored it and opened aged afteen, who recently gave battle
pon his sleeve.
east that he did not up a new line of investigation. "What to a passo of revenue officera, killed |
Pre Is the matter, then 7", he demanded one, wounded another and put the
sauntered idly along calmly.
United States deputy marshal D
th of dalllance, in- "We quarreled," confessed Uncle command to fight.
ve irtations with his
rgarten teacher, and
fairy with the faxen
hlm generous Idases
bands from the ad-
of bis tenth birthday
party-such a party!
she appeared, pink-
bo world
e dimpled, demure,
as though
wandered, just awak-
1uge gilt frame in the
ively longs surrept
o convince one's self
Jack.
"What about?" Bully's Inquisitorial
tune was recognized and feared on ac
casions by all the family.
Docle Jack shrugged his shoulders
"You can search me," he answered ex-
presalvely. I don't know what about.
The fact remains that we did quarrel.
and now she won't speak to me, so I
can't tell her I'm sorry and ask her to
make up."
"Are you sorry
demanded Billy.
"Oh, yes, I'm sorry all right." admit
A new-made mound in the village
burying ground marks the place
wbere lles Charlle Smith, deputy mar
shal, with a bullet sull embedded in
the muscles of his beart. The slatera
are charged with killing him. One or
buth admit it but they declare they
fought in defense of their aged moth-
er whom Smith had shot and beaten
with his revolver when a raid was
made on their still in the mountains
of Pike county.
Revenue nostrils bad scented stow

the type of little glted Uncle Jack with a rueful laugh. Ing mash in the mountains back of
"However, that don't mend matters Sergent, in which cord was being
any, so don't bother your curly bead converted into whisky in violation
about It, Billy Boy. You'll have trou-of at least eeren pages of goverp
bles of your own some day."
ment statutes. Of course it had to
o she lisped enchant
advent Billy beheld
Ideas of femininity
L
dance with the other
protested his mother,
15 reluctant steps
would not Ilke
ed, "and I'm afraid
to
e than four dishes of
evening."
name!
I's devotion on
bla
passed him on the
noon, seated in the
be snub-nosed boy
Billy thought of the inconstant Bes- be raided. The task was assigned to
sle and wisely remained silent
Belshazzar, waking, stretched him
self lazily and wandered out of sight
around the corner of the house. Billy,
absorbed in thought, followed I
Uncle Jack really wanted to make up.
surely Bessie's aunt ought to be in
formed of the fact.
than
Deputy Marshal J. Matt Potter, one of
the bravest omcers in the south. For
seven years be has been in the serv
ice of Uncle Sam, and more
twice has shot off moonshipers who
Ared on him. He picked Lev! Small-
wood and Charlie Smith for such
moral support and physical participa
"Tll go tell her," decided Billy tion ■ the occasions might require.
sagely.
Behold then presently Billy trudging
sturdily up the street with Belshaz
zar tagging bappily at his heels. When
be bad turned the first corner he
In his flight over the Cantabrian
mountains, while roaring at a lofty
height, a monster gray eagle attacked
Gilbert, swooping down on the aero-
plane and beating the aviator with

beak and talona.
Gilbert's aeroplane required all h
attention because of treacherous air
currents over the mountains. The m-
Eagle Attacks Aviator.
chine was at a height of 4.000 feet.
with the country lying dim beneath.
Tho great bird circled round andi
round the aeroplane, evidently think-i
the bird family. Finally Gilbert ma
aged to draw bis revolver and fired,
two shots at the eagle, driving it off..
when the aviator landed here bo de
clared tho aerial battle with the glanti
bird bad given him the most exrilling
moments of his career.
They crept up the guich and came
to the mountainside clearing at mid-ng It a new and monster member of
day. Before the Tackitts knew what
. haughtily UDCOD-
was happening the son of the family
ence, while be of the
was caught, bandcuffed and placed on
rinned at him offen-pied Bessie's aunt, book In hand, com a rock, an easy captive. This was
fortably ensconced in a hammock in only the beginning of the Oght.
the shelter of a tiny summer house.
Uncle George Tackitt, head of the
Making their way directly across the family, was away from home. This
lawn, Billy and Belshazzar appeared
before her with
deuress.
ceed.
sauntered casualy
later in the day and
d the snub-nosed one
of the coach boose
mercy, but this con-
teous vengeance was
punishment for the
ntly around the cor-
in gloom, with hands
lilly's big uncle Jack
Jghted pipe despond-
seated himself be
e steps and watched
s dejectedly.
unsociable. untalka-
of men was distinctly
disconcerting
Bud-
"Why-how do you do, Billy Boy?
ald Bessie's aunt a little uncertainly.
It was hard to presage what a visit

from Billy might portend
"How do you do?" responded Bilty
with owl-like gravity; then wrinkling
bis forehead thoughtfully, he regarded
her with unwinking gaze for an appre
ciable space u time
"I don't k you're pretty." he
stated at last judicially.
Bessie's aunt laughed deliciously.
"To tell the truth, Billy," she admit
erlence that bo view ted confidentially, "I don't think so
DOD
with wonder.
e possible that the
Jealousy bad like
soul? With chin in
either."
"But I guess my Uncle Jack does," (
continued Billy, whereat Bessie's
ed upon the problem aunt forgot to laugh and blushed in.
The cause of Uncle
ain to him. Around
Constant Bessie
stead.
"And he don't know what you
and him quarreled about," went on
Billy gravely, "but he's sorry anyway,
re- and it wasn't about Mr. Stanhope, be-
cause he says Mr. Stanhope is a non-
on something that I forget, but if I
Was Uncle Jack I'd Dunch him." Bald
nt satellite yelept.
Ir whom Billy had
Tincia reale An.
At one time the eagle attacked him
so fiercely, he said, that the aviator.
had to take his hands of the levers
and momentarily lost control of the,
machine. It was at this time that the
Intrepid alrman drew his revolver.,
The first shot went wild, but fright-
ened the bird, and the second struck!
it. Gilbert regained control of bis.
macbine just in time to keep it from,
crasbing to the ground.
NAILS TALKING GIRL TO CHAIR
Unusual Kind of Assault and Battery
Charged Against New
Jersey Man,
New York John Eddings, the odd.
jobs man of Prospect Park borough,,
N. J., Is awaiting trial op a charge of
assault and battery, but it is such an

unusual kind of assault and battery
his fame in that section will not bo-
dimmed for many a day. Miss Barbara
Pacbtold, Eldings' sister-in-law, is
only nfteen years old, but she talks.
Sheboygan
Wisconsin
daily Press
6-30-101

[PAGE BREAK]

LBI was microcephalic. The authors proffered specific anatomic details to establish their case. However, even when researchers agree on details of hobbit anatomy, it seems they can't agree on their meaning.

Chinless Wonders

Take the chin. Chins mark a skeleton as sapiens; no other hominids have them. Everyone agrees that the two hobbit mandibles lack chins. But the PNAS paper asserts that appearing chinless does not necessarily mean that the hobbits were not H. sapiens. The paper included a photo of a live Rampasasa pygmy with what the authors termed a negative chin.

But paleoanthropologist Jeffrey Schwartz from the University of Pittsburgh (Pittsburgh, Pennsylvania, United States) points out that although having a chin signifies our own species, there are individual exceptions, so chinlessness doesn't say much. "Having a chin provides information. Not having a chin doesn't."

...it's pretty much the usual fossil
furor...

If chinlessness can't illuminate the discussion, what about teeth? Hobbit teeth are a strong reason to think they may not be a new species. Everyone agrees that compared with other hominids, which have big teeth, hobbit teeth are small, like sapiens teeth. Not only are they small, according to paleoanthropologist John Hawks of the University of Wisconsin (Madison, Wisconsin, United States), hobbit teeth are small in the sapiens pattern: first molars are biggest and third molars smallest. H. erectus and Australopiths have different patterns.

Robert Eckhardt of Pennsylvania State University (State College, Pennsylvania, United States), an author of the PNAS paper, argues that chance convergence of traits in different hominid lineages is unlikely to explain these similarities. Co-author Etty Indriati, colleague of Jacob's at Gadjah Mada, notes that hobbit teeth also share features with Rampasasa pygmy teeth, such as rotation of the premolar, that imply genes in common.

Ralph Holloway, paleoanthropologist at Columbia University (New York, New York, United States), who shares the critics' belief that LB1's brain was pathological,

nevertheless was dissatisfied with the PNAS paper. "It's the kind of paper that should be published, but they could have done a better job on it." Hobbits, he says, should have been compared to several populations. Indriati responds that it is sounder scientifically to compare LB1 with Flores pygmies, its closest neighbors in both space and time.

The Meaning of Asymmetry

Holloway agrees that LBI's cranium is asymmetrical. But he and others also agree with University of New England co-discoverer Peter Brown that asymmetry could result from being under several meters of deposits for several thousand years, plus the difficulties of recovering and reconstructing bones described originally as like wet blotting paper. Hobbit bones were never fossilized. "To use that asymmetry to make a case for pathology, you know, I don't think that's a very strong argument," Holloway says.

The PNAS authors reinforced the case for asymmetry with striking composite photographs of LBI's face (see the Figure). They divided right and left sides at the midline and mirrored each side to yield two photos displaying obvious differences in right and left side facial architecture. A "heuristic device to emphasize the left-right differences," according to Eckhardt. However, says paleoanthropological craniofacial specialist Todd Rae of Durham University in the United Kingdom, "You can know if it's markedly asymmetrical only by comparing it statistically to other specimens that have also undergone the process of burial and recovery-i.c., other fossils."

The Hobbit's Brain

A March 2005 paper in the journal Science, whose authors include a subset of the discovery team, reported that a virtual endocast of LBI's cranium, which has brain features imprinted on it, suggested that hobbits were not simply miniature versions of sapiens or erectus, but still may have had human-like thinking abilities because the prefrontal cortex and temporal lobes seemed expanded. The region, known as Brodmann area 10, is thought to be the seat of higher cognitive processes like memory, communication, and planning.

By contrast, Holloway, who has also studied an LBI endocast, says the brain's small size and some other features hint at pathology. Parts of area 10 called the gyri recti seem too thin, he reports, and he has never seen a human endocast so flattened out before, which also suggests abnormality. Like several other researchers, Holloway has tried (and failed) to find direct correspondences between LBI's cranium and those of people with microcephaly. Microcephaly, meaning simply small head, is an umbrella term for a miscellany of conditions with scores of different genetic and environmental causes and myriad manifestations. The most recent study, published online in Anatomical Record on October 9,

2006, concludes that "it is not possible to match any of these syndromes exactly with the LB1 fossil," although the authors argue that some microcephalic syndromes share features with LBI, including stature, head size, and anomalies of jaw and teeth. As all the studies point out, nothing so far unearthed in the clinical literature or the fossil record matches LB1's peculiar head. Those negatives, of course, don't rule out deformity, especially deformity unique to the hobbits; isolated populations routinely develop distinctive abnormalities.
Debbie Argue of Australian National University (Canberra, Australia) and co-authors of an October 2006 paper in the Journal of Human Evolution say LBI is probably not microcephalic, and they endorse the designation of a new species. They also say the hobbits are not pygmy-like. They suggest instead (as have others) that, whereas LBI's cranium is not like anything else in the hominid fossil record, some other hobbit bones resemble much older early human (but non-Homo) fossils known only from Africa-the Australopithcines.
A Very Ancient Mariner?
The original Nature paper had speculated that hobbits might have been a dwarfed descendant of H erectus. H. erectus was near our size, huge compared with tiny LBI, and members of the discovery team have backed away from that notion. Argue and colleagues concur that H. erectus is an unlikely ancestor

[PAGE BREAK]

common sewing needle DI medium
size, an inch and five-eighths in length,
and drilled a hole through Its entire
length from eye to point
BIBLES
The most handsome line of
bibles in Indiana can be seen
at our store. Pibles to suit
everyone-with the large bold
print that is easy on the eye.
Bibles for the older folks,
Bibles for the teacher.
Bibles for the young folks.
All moderately priced.
Testaments with extra large
print suitable for church: e. vice.
Smaller testaments as well as
the pocke edition.
See our line of bibles.
Copyright by larris & Ewing.
CHARLES L. MAGEE.
the
decree emboilies "substantially men were isolated in the Philadelpala
all of the requests made by the gov-, hospital and their homes were quaran-

ernment.
Mr. Wickersham opposes the objec-|
tion of the independents to the size of
On Dec. 1 Red Cross Christmas the distributed companies with the
stamps will be placed on sale in all statement that the public would bene
the cities of the country. Charles at more by competition of large well
Magee, secretary of the American organized companies in strong hands
Bociety, made this announcement at than fron destructive competition be-
Washington.
tween a great number of weak organi-
AFTER LONG ILLNESS
zations.
tined.
EAGLE ATTACKS HUNTERS
Lively Combat Before Glant Bird Is
Killed.
Altoona. Pa.. Nor. 17. Wilbar
Lantz and Charles Mason while hunt-
ing in the Allegheny mountains had
a lively battle with a big eagle.
Mason wounded the eagle and Lantz
Asphyxia Caused Fall, Says Rodgers. shot the bird.
Angered it swooped down at them.
They clubbed the birl but fallel to
Pasadena. Cal. Nov. 17.-"Etherial
asphyxia" is what caused C. P.
Rodgers' fall just as he was complet-lit. The bird bit Mason's fort
Mrs. Schwartz Was Very Weaking his coast-to-coast light, he says, through his boot. Lantz was severei
and is responsible for the death of scratched on the hands by its claw .
The eagle measured fifty-two
spread.
Vinol Made Her Strong.
When we tell you that Vinol is the
best remedy in all our stock for mak-
ing weak people strong and vigorous.
we are only telling you what has been
proved hundreds of times.
pany aviators.
7.252.963 in Greater London.
London. Nov. 17 Greater London
es
has a population of 7.252.963 and CHLOROFORM ENDS HER LIFE.
covers an area of 693 square miles, ac-
cording to statistics published by the Dr. Kirk, Woman Phys can of
burg, Kills celt.
For instance, Mrs Y. F. Schwartz county council.
Bio 17
V-
re
>d
1r
1r
1-

Evening Gazette
Indiana
PA
11-17-1911

[PAGE BREAK]

age turned out and a
They
Shoot
bits in the
lark Vicinity
Clark.
Kaser of
with a party Friday
shot a rabbit in a
gular mer.
umble over a pile
and fell discharg
barrels of the situl-
arril. A rabbit
imped ; to amper
just that
moment.
nil discharge and
f.
and Carl Kaser and
any who were hunt-
ilianles are cougrat-
hemslves that they
when the
ulled bis unusual
der:vel
pon the sale will set in t'
interest the work in Coshocton.
The Federation has also pedal!
itsel assist in furthering the
duva.ional psf work that
as accomplished sue in th
antini reulosis rusade. A TI-
Lerulosis committes was appoint
rl be in charge the details:
of work to be undertaken locally. I
This committee included. Mrx, F.
E. P. Miss Tillie Lauri
Mrs. Carl R. Herbig. Mrs. 1. P.
Gallager and Miss Emma Man-
Hrl.
Early Xmas Shopping
The City Federation also plly-
itself yesterday at the meeting
of the executive board to do ail
in its power toward securing IL

san Christmas for (shorton.
(Continued Or Page Six.)
Delightful
Concert by
Cleo Clu
Nimrods
Find Game
Plentiful
HUNTING SEASON
WITHOUT SINGLE ACCI-
DENT.
(it supreme court case.
Netion of one witness, the de
frase complete its case late yes
day, aw Van Epp began the
State's rebuttal.
The rase is expected to to
the jury Monday.
Worries While Waiting
But it's a long time to wait,"
said the white-haired prisoner to
day. Whatever's coming has got
to come, and I wish it was over,"
Chris habled into The court-1
room for the afternoon session
Thursday with his packets bulg
OPENED in full of big red apples.
They're from my farm.
said
proudly. He insisted on giv
ing them all away to friends.
It's so noisy in here, ain't it?")
he whispered, during a recess. He
The fields and woods of this sec-looked armand at the rowd stand-
ing six deep at the rear of the
tion were fairly alive with 12-
You know they're talk
rols who tok advantage of the
pening of the hunting season all the time about me. I can
Friday. While everydy seemed hear
1 satisfied with the amount of
game to found. fortunately not
a single aident was reported.
Rabbits are reported unusually
plentiful but quail very scare.
Babbits for Supper
Enough rabbits to feed The
to attend
Mom,
m
Many Women Attend
Three-fourths of the spectators
the six days of Stener's trial

have been wonren.
Steuer's case will go to the jury
with two main lines of defense.)
that one other than Steuer)
the may have committed the crime.
i will I served and that Steuer, if he did commit

Monster Eagle
Caught in Trap
in White Eyes tp.

A biz gulden agle caught
in a trap on the Everett Boyd
Farm in White Eyes townslap
is attracting a crowd of inter-
ested spectators. The cage
weighs twelve pounds and
measures six feet from tip to
tip o its wings.
A turkey had killed
on the lyd arm and Mr.
Boyd set the trap in an effort
1 tin what had caused the
loss of the Thanksgiving r
-be found his answer Thurs
day afternoon when the eagle
was seen struggling to v
himself from the trap. The
nairle's mate has also b
sen in the vicinity. The bird
now in cusy at the Boyd
farm was jured as it was
held in the trap by its claws
only

Generally Overlooked

It is under
ture
that
the law has bee
generally in aller
tunties of
These ai with it is my h
Hye viation may prove
ang anyone who cares
to at has cause some i
1.
Sendit.
Still should the matter le
st, it is thought that
law would all a man to correct
The versight in his expesse e-
count as tied with the board.
The law provides that five is
may institute proceedings against
violator of the corrupt practis

law and certificates of in
may be withheld until the election
art is satis! that all provis
ions of the law have in compilat
with.
Check Stubs Will Do
The expense at 'cold' at the
Denperatie committ, last
night, while it was accompanial
by no vouchers, had the stults f
heks, by which practically all
hills were paid mind which it is
thought will answer the purpose.
Hermit Pays
Coshocton Morning
Coshocton, Ohio
11-16-1912
Tribune

[PAGE BREAK]

1 cast twinry-wan
Inderwood."
in! Misther Chair-
1. waving his hand
ange that vote!
!"
I
MULI Wild DCALDE 003 LAVIC RILE
his club and crying:
"Order! order! order!"
WAR
merling appeared at a window in her between them was the snake.
home, and then tried ta make love
to hor. paid a fine of $5 and costs
before Municipal Judge Sabath at the GIANT EAGLE ATTACKS WOMAN
Shakespeare avenue court the other
day. He made no denial of the girl's
charges and informed the fudge that
he has since married another young
"To hell with order!" bawled some
one from the First ward.delegation.
"On this ballot," Muldoon was call-
om the Fifth ward ing. "there were sixty-nine votes cast;
necessary to 2 choice, thirty-five.
James P. Conway has received forty
votes; John W. Underwood, twenty- woman.
nine, and George W. Simmons"-he
paused, as if to decipher the vote-
"none. James R. Conway, having re
ceived the necessary number of votes.
is therefore declared the nominee of
this convention."

an," sald Nolan.
heavy foot on ble
forefinger at Mul-
order! The gintle-
ward has no right
te av tbe First
ember of the dilly.
ard be polled."
n. Nolan took his
r and stepped to
very man in the
lon, as his name
credentials, cried
he secretary near-
aabue, Nolan lald
the fellow's shonl
· Underwood was stunned. He stag
gered through the horrible uproar to
ward the door. He longed for the air
outside, even the heavy air of lower
Clark street, where the people surged
along under the wild, dazzling lights,
in two opposite, ever-passing proces.
slons. His head reeled. He lost the
sense of things, the voices about him
seemed far away and vague, he felt
himmalt Antnahad no it were from all
i

Wadjinski lives at 2969 North Ridgeway avenue and Man Emmerling lives at 2970 North Ridgewny avenue. While Wadjinski was percbed in the tree and the girl was ordering him to climb down. Mrs. Anna Emmerling, her mother, called the pollen. Wadfinski descended he found himself under arrest.

When

"I knew he was going to marry another girl and I didn't want his attentions," Miss Emmerling testified.

"It's all done with now, judge," said Wadjinski frankly. "It happened, all right, but I married another girl.

tore my clothes climbing the tree."

"Five dollars and CORTA" Baid tha

Bird Measuring Nine Feet From Tip to Tip Is Finally Killed by Georgian.

Moultrie. Ga.-Mrs. C. W. Hall, who lives near here, was attacked by a monster eagle the other morning. Finding the huge bird attacking a

pig, she tried to drive it away, when
the eagle turned on hor.
The woman was badly scratched
and beaten by the bird's wings. Hop
husband hurried to his wife's relief.
The eagle, still deflant, attacked Mr.
Hall and was killed with fence rail.
It measured from up to tip nina
feet, and is the largest ever killed in
this section.
Cow Hap Litter of Calves.
Dawall
Park Colo. A cow balonm
Grand Rapids Tribune
Grand Rapids
Wisconsin
8-27-1913

[PAGE BREAK]

PELOQUIN, Box 116, Sterling, Conn.
Massena, N. Y.-"I have taken Ly-
ja E. Pinkham's Vegetable Compound
nd I highly recommend it, If anyone
vants to write to me I will gladly tell
er about my case. I was certainly in
bad condition as my blood was all turn-
og to water.
I had pimples on my face
nd a bad color, and for five years I had
een troubled with suppression.
The
octors called it 'Anemia and Exhaus-
ion,' and said I was all run down, but
ydia E. Pinkham's Vegetable Com-
ound brought me out all right."-Miss
AVISA MYRES, Box 74, Massena, N.Y.
Young Girls, Heed This Advice.
Girls who are troubled with painful or
regular periods, backache, beadache,
ragging-down sensations, fainting
pells or indigestion, should immediately
eek restoration to health by taking Ly-
in E. Pinkham's Vegetable Compound.
peal, but a clarion call. When an en-
tire nation is aflame the poet is apt 10
find his mission rather perfunctory.
Finally Captured' Eaglo.
Ho
After defying a score of traps and
as many guns of farmers, who have
sought vainly to Impose summary
sentence for the loss of hundreds of

chickens over a period of six months, Old Baldy. a monster eagle, was caught by a man with a lasso.
Jay waiting in the shadow of his chicken house for the chicken thiet for more than eight hours. The bird swooped down shortly after daybreak The lasso was thrown around the eagle's neck. The man wanted to capture the bird alive, but it fought so desperately that he was forced to shoot it. The eagle measures eight feet seven inches from tip to tip, and weighs 73 pounds.
Ko■goas■■ dashed on, and when he met a man or woman he esteemed he gave him or her a violent shove and shouted "Help!" On the counter in Korgodsky's store was a small pack-■g■. It ticked. It was-it was E bomb!
There were fully fifty people fleeing with Isaac now. They descended upon the Maxwell street police station.
The Maxwell street police sergeant is used to many things. If a pink Philooloolu bird should enter the Max-well street police station and say, "A regiment of Somali troopers is about to advance upon Isaac Korgodsky's dry goods store," the sergeant would reach for his pencil and make a note of it.
So when Isaac himself appeared with his procession of wildly excited relatives and friends the sergeant in-quired, "What's up?"
"A bomb-a hambi" sold Tonon

Rev. E. Heslop
Kidney Pills the
ed and he felt hi
he has. been bene
the use of Dodds
eral months late
not changed my i
since the above si
ized. Correspond
lop about this w
Dadds Kidney)
your dealer or [
Buffalo, N. Y. T

Hints, also music
(English and Ger

cipes for dainty d
Adv.
Stevens Point
Daily Journal
Stevens Point, wisconsin
10-5-1914

[PAGE BREAK]

put IIUK-ritory 01 AirSkand
ey, of Harvard, but lately out of the
hospital, is confident his team will
smash its way to victory. Betting on
he game at the present time (Inds
larvard a favorite at 10 to 7.
There is plenty of Tiger money in
sight and more euing along on every
run as the Princeton rooters arrive.
The Harvard players are resting up
ve DructionI
Con-
suffrage in the following states:
ecticut, Delaware, Florida, Jowa. Ili-
nois, Kentucky, Michigan. Massachu-
selis, Minnesota, Mississippi, New Jer-
sex, Nebraska, New Hampshire, North
Dakota, Ohio, South Dakota, Vermont
and Wisconsin.
After defying a score of traps and
at the Brooklyn club, where they will guns of farmers of Buckingham, Cal.,
remain until tomorrow morning. The who vainly sought to caplare him for
Irinceton athletes reached Boston to- the loss of hundreds of chickens over
Jay, thu hacks this morning, and the pebod of six months. Old Baldy, a
rest of the squad later in the day, and
they will have an easy practice as a
their trip from New Jersey.
method of working off the fatigue of
The buck field men will work out at
RUMOR SULTAN
monster eagle, was caught by Harry
Radellifo with a lasso. Radcliffe wait-
cd in the shadow of his chicken house
for more than eight hours and sue-
ceeded in throwing the lasso around
the eagle's neck shortly after day-
break The bird measured eight [eet
Feven inches from top to tip and
IS A PRISONER weighed seventy-three pounds.
For traffic on Lake Okanogan, Brit-
ish Columbia, the Canadian Pacific
railway has launched a steamer 200
feet long and forty feet wide, steun
Fort

Wayne
New S
Fort
Wayne, Ind; and
11-06-1914

[PAGE BREAK]

Glant Bird Shot Near Wilkes-Barre
Had Tell-Tale Wool In Talons.
A mountain eagle measuring seven
and a half feet from tip to tip of its
wings and weighing thirty-five pounds,
was shot at Hay's Cohners, about
twelve miles from Wilkes-Barre, Pa.,
by Ollie Hay.
When brought down it had lamb's
wool in its talons, and the raisers in
the section are now looking for its
nest to verify the theory that it car-
ried off several of the small lambs of
their flocks.
The farmers say that the eagle was
powerful enough to carry off a three-
year-old child. It is the first eagle,
ever shot in the region, according to
farmers who have lived in the vicin-
ty, all their lives.
ceased-Letters testamentary on SRIU ESTATE
having been granted to the undersigned all pet-
sons indebted thereto are requested to make im-
mediate payment. and those having claims or
demands against the same. will present them
without delay for settlement to the undersigned
residing in Oxford township.
Route 3. New Oxford. Pa.
CLEMENT LINGG, Executor.
HEALTH A FACTOR IN SUCCESS-The larg
eat factor contributing to a man's success
is undonbtedly health. It has been ob-
eerved that a man is seldom sick when
his bowles are regular-he is never well
when they are constipated. For consti-
pation you will find nothing quite so good
as Chamberlain's Tablets They not only
move the bowels but improve the appe-
tite ond strengthen the digestion. They
are sold by all dealers.
Yon never can tell. Even a man who
wants the earth objecte to having mud
thrown at them.
day or Apr. 1915.
Correct-Attest:

K., SKALEI, J. F.
JOHN N. HERSH,
W. H. STOCK.
J. M'LAIN GILBERT.
Directors
OLD DR.THEEL'S OFFICE 198
OPRING GARDEN ST., Phila Boy're pran
tlea, My Garas Treatment the best. had no
equal; better than all latest discoveries, beats the
World & " in curing cos Polson; only one
that has no after fests. Bafferere from
(now eang 194-19 dara); all Chronic, Woo
Less
"CERMAN TREAT
restorer of
Lost Menty Vigor, quick & safe. Sworn
Tevelation to all operating YOUNG &
OLD YOUTH PHEN A SEGUN Hours: 1-45Son 22
4 After all other fail-the term Treatment" res
LCOT CUREDIAL better grander oath:
OLD DR. THES
Berman Treatment cured & wife, after the
use of percarial de latest co-injection trent
ment that nearly killed us. A total wreck uncle Fred
Look an to Dr, Theol who cared him from the worst.
kmd of Specific Blood Polon, General Weaknean &
Laxes Ed years ago. Son eye from Special a Caro
hic ailments, Dalm. Lost Viger, Broken down a Unkepp
& if robbed & fenced, hewan, pead for O Dr.
new book free. A relation
WENT scan not be duplicatur. The pay
If you want the news while it is new
[AD] subscribe for the ITEM.
News and
any other 1
price is Onl
Job Printing of every des
ces at Item office. Hand in
New Oxford Item
PA
5-13-1915

[PAGE BREAK]

Giant Bird Shot Near Wilkes-Barre
Had Tell-Tale Wool In Talons.
A mountain eagle measuring seven
and a half feet from tip to tip of its
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pation you will find nothing quite ao {
as Chamberlain's Tablets They not
move the bowels but improve the a
tite ond strengthen the digestion. 1
are sold by all dealers.
Yon never can tell. Even a maa
wants the earth objects to having
thrown at them.
Penn. 5-13-1915

[PAGE BREAK]

Powder WDER
rity Bank Eleventh and
Broadway
AVINGS AND COMMERCIAL
SURPLUS
Note the Growth of this Bank:
ARY 1, 1914.
1. 1914.
31. 1911..
MBER 1, 1914.
...$487,000.00
[AD] $1.799.584.11
[AD] $1,982.225.79
.$2.118.545.26
.$2.248.824.50

nesseans.
robbed Graves' store and shot him.
Inflicting scalp wound, when he
cried out for help as the hold-ups
were leaving.
son one.
Fo
It rehe
tious sto
ever read
Mi-o

MAN ATTACKED BY EAGLE

MONTEREY, Tenn., Nov. 20.-Victori-
ous in a battle with a large gray cagle.
Alverez, John Gunther, convicted of
J. G. Stephens, a teacher at the Meadow a holdup. and Edward Harrison, con-
Creek schre, & few miles waressed burgiar, were taken to San
had an experience unique among Ten-Quentin prison this morning.
Gun-
from school and passing through some:
Steptors was returning home ther is given three years and Harn-
dense woods when the giant bird sprang
from a log beside the roadway and with

TWO BODIES RECOVERED.

wings outstretched and a hissing shriek
SEATTLE, Nov. 20.-The bodies of
attacked him. Dropping a dinner pall. two miners were recovered from the
Stephens picked up a stone and suc-wrecked Ravensdale mine of the
first blow,
ceeded in hitting the eagle with his Northwestern Improvement Company Pr
killed the bird, The eagle measured 4
Then seizing a club he soon today, bringing the number found to
feet 6 inches from tip to tip of Its seventeen and leaving fourteen still
in the mine.
wings.

DR. DUMA NOT ENNOBLED.

GOT HIS GOAT: ATE IT, TOO. VIENNA. Nov. 20.-Dr. Constantin
NEW TORK. Nov. 20. Rocco
Theodor Dumba. former Austrian
Penna, who lives in the Bronx, was
ambassador in The United States.
having his goat cooked in a near-by who arrived here three weeks ago.

Oakland Tribune
Colifornia
11-20-1915

[PAGE BREAK]

LEANSING
OWDER
leventh and
roadway
ICIAL

nk:
[AD] $487,000.00
.$1.799.584.11
£10097
Orpheum audience on next Monday night. | Quenti
"Again thanking you for your courtesy out the
in the matter, I am
been k
"Yours very truly,
Signed) "HOLDINI.'
1 P
grocer,
robbed
inflictin
MAN ATTACKED BY EAGLE.
cried c
MONTEREY, Tenn., Nov. 20.-Victori-were le
ous in a battle with a large gray eagle, i Alver
a hold
Tessed
son on
TW
J. G. Stephens, a teacher at the Meadow
Creek schre, a few miles won
had an experience unique among Ten-Quentir
nesseanS. Stephens was returning home ther is
from school and passing through some
dense woods when the giant bird sprang
from a log beside the roadway and with
wings outstretched and a hissing shriek
attacked him. Dropping a dinner pell. two mi
Stephens picked up a stone and suc-
ceeded in hitting the eagle with his
first blow. Then seizing a club he soon
Killed the bird. The eagle measured 4
feet 6 inches from tip to tip of its
wings.
P
CAT IS GOAT: ATE FT. TOO. i
Oakland Tribune
California
11.20.1915
SEAT
wrecked
Northw
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in the
DR.

[PAGE BREAK]

VILIAN

ERN ISLES
b. 4-Control
other insular
d States would
r and aars de-
In the hands of
er terms of a
r Senator Wil
mended by Col.
his report to
conditions in
IGE
4-Kalapano.
ige play, "The
dav."
which the world is experiencing to become evident enough to bring son
taneous retorts from scientists.
Doctory and scientific men, Low-
er, explain that the self-killings are
but the acts which result from a dis- GIANT EAGLE ROPED
ensed mind. Professor L L Thur-f
stone of the University of Chicago
paychology department, thinks at least
seme of the causes for student sui-
rides are found in the public attitude
toward mental sufferers
"Mental illness shorld not be a
How Doctors Treat
BY MEXICAN SHEPHERD
SAN ANGELO. Texas, Feb. 4.-
Jose Villalobo. 5-year-old Mexican
sheepherder, recently roped an eagle
perched in a tree. Men have roped
deer and bear but never before an eagle,
at least not within the memory of
the oldest old-timers The eagle w88
brought to town and plared on dis-
play in a window-the only ilre engle
seen here in years.
Colds and Flu The
measured
To break up a cold overnight or to a
le an American bald,
feet from wing to winz.
Is
exchang WINCH Will aer
henefits and improvements with
ather local exchnuges in the state,
said.
ABOUT BABIES
LONDON. Feb 4-The birth r
for the laboring classes of Great
nin, announced recently, is 231 bir

for every 1. laborers
In the m
feal profession the births were re
puted as 103 for every 1.000; 105 |
1000 for ministere
Girls Have Used
G.F.P.For 50 Year
Port Arthur News
Tex as
2-4-1927

[PAGE BREAK]

Liny
Paris, Aug. 11-P-Myron T.
1Terrick, American ambassador In
Paris, has directed the attention
of the French foreign office to the
"ybsurally and Impropriety' of n
Blory published yesterday afternoon
by the newspaper La Piesse declnr-
Ing that H. M. Blackmer, Amerl-
an oll operator, is being pursued
In Pranco because Secretary Kellogg
und President Coolidge wan: "secret
documents of high political Import-|
ance"
The rowspaper snid that efforts
to extradite Blackmer on per-
Jay change in connection with his
income tax returns, were a mere
blind and that four American Becreb
se: vico non linve been seeking to
arrest Blackmor on French soll
continry to all law and precedent
EIGHT INJURED WHEN
BLAST FOLLOWS FIRE
Chicago, Aug. 11-)-Eight per-
sons were burned or Injured one of
Huge Eagle Attempts
To Carry Off Child
Lubec. Maine. Aug. 11-
An immense engle
swooped down into the ward
nt the fnm of Guy Lyons
near here yesterday, seized 2
year old Buddy Lyons in its
talons and sought to carry
him away.
Buddy's 5 year old brother
grasped the child's nnkles
and after a tussle pulled him
[rec.

The bird which had a wing
spread of seven feet sonred to
a nearby ice and remaine
(here all day. It was the first
time that an eagle had been
known to attempt to carry off
a child in this territory, al-
though the birds, protected hy
federal Inw, havo talded poul-
try yards.
IBIMINI EUILIU MIL
REGISTERED TODAY
Boards to be in Session ir
Each Precinct Until
8 O'clock.
Many voters in the city hrd :
noon todny availed themselves o
the opportunity to register at th
polling places in the 11 precinct
of the city, where the boards o
registration went into session at
o'clock this morning.
The places of registration will b
open this evening until 8 o'cloc'
for the convenience of voters who d
not have the time to register durin
the day. It was expected that
nige number would take advantag
of the opportunity.
This morning 3.009 votes ha
Ironwood Daily Globe
Fronwood, Michigan.
8.11.1928

[PAGE BREAK]

1120
chaiged with attempting to form a
dictatorship.
CHICAGOAN ROBBED
(By 7ted Puss)
men
CHICAGO, March 10--Two
held up Edward Gertz, vice presi-
dent of the National Brokerage
company, Tuesday, in the vestibule
of his home and robbed him of a
900 diamond ring and $100 in cash
RADIOLOGIST DIES
(By Imited PIAST
LONDON, March 10- Prof Mar-
in Haudek, famous Roentgen 1a-
lologist of Vienna university, died

ddenly Tuesday of heart disease,
n
Exchange telegraph dispatch
rom Vienna sald. He was 51.

GIANT EAGLE SEEN
NEAR STONINGTON

(Special to The Herald)

STONINGTON, March 10- An eagle with a wingspread estimated at seven feet, has been Been frequently about the Ponting farm three miles west of here in the past few days. The bird, according to Tom Ponting, appears to be unafraid of humans and has sat idly in a tree while a man rode horseback underneath No effort will be made to shoot or capture the bird, it was said.

"The testimony of Dr Harger (a defense witness) will always re main in my mind He testified that Arlene was not poisoned There has been no evidence that she was drunk because she wasn't She was knocked unconscious on the porch of the Thompson home. then taken to an automobile and ravished

Prohibition Not Issue

"Prohibition is not ■■ isque Drunkenness doesn't Pxcuse his crime.

"Gentlemen, the hearts of mothers over the nation are anxiously awaiting your decision. They are waiting to see if you will put a tamp of approval on this Sefendant's act"

Decatur
Herald
Illinois
3-10-1931

[PAGE BREAK]

9. 1931
RO Eagle Attacks
Dog in Yard of
R
Owner at Tahoe
LANDE

Bl
AUSTIN, N
TAHOE CITY. Cal. Apr 9-(8pe-|
clnl) Ed Wagner of Lake Forest tells |
of monster eagle which he says,
swooped into his front yard one day The county (
this week to attack his dog Wagner the budget d
describes the eagle as having an eight their session
foot wing spread and class as large; Charles Ram
as a man's hands He says that when game warden
the creature was deprived of its prey the county
It angrily swooped 60 close to als county will
head that he could feel the swish of year than las
wings
immediately
Wagner
Mrs John
-Play- warned hle neighbors in
case their Margery and
18" on, small children might be imperiled by ed Tuesday fi
la feet, the great bird, and he decinres he is they spent t
n Un-keeping his rifle in readiness against Hiskey and
nt Hill its possible return
some time in
led to
A bird of somewhat the same de-
ooting scription was seen to attack a laige
is feet cat in the Lake Forest vicinity a few
in the months ago, an two eagles were
Ellled near there last fal! It is feared
there may be a colony of them nest-
d the
es and ng somewhere in that locally
at La-
rivors
B time
while
round
a. and
erto!ro.
Three
Oray
1 been
The Rebek
for their firs
ing in two mo
ings being g
ceedings
Mrs Edgar
Austin visito
Reinhart has
and then I noticed I didn't feel the Mrs Littrell
pain while I looked at the lightning.? KIY and N

"But It's awful hard to forget about I panied by the
this pain that keep running through visiting Mr
my legs "
Two dark scars on his left foot are
& reminder of the horse accident
Bryan has a soft, throaty voice with
a baritone quality
The Untiedt home is modest It is
a green-painted house on a 160-acre
They raise mostly corn and
farm
whim- they burn corn cobs to ease the fuel
I wish bill. They have five horses, includ-
ing two ponies for the youngsters,
16 for- and six cows
1. elev-
Austin. The
from Utah to
week or so
dent of the
pany
Relatives I
of Mr and
Austin Mr
entertained:
Re
STOCKHOI
The living room presented a picture take the Lori
oduced of rural life Besides the couch on
which Bryan rested, there were in the
played room a brass bed, a few chairs, a
ps It small tablo upon which potled geran-
fums stood by one of the two win-
esident dows A big wooden pail with some
White, other plants stood at the other win-
lon as dow.
he has In one room was a heating stove,
attrad and overhead from a stretched clothes
he has line in a triangle shape hung 615-
Includ pended a lot of stockings and other
garments.
ms ut-
act he
Hanging from the picture molding
near the celling in one corner was a
up battered violin case and beside it a
antics banjo.
ut
bed the "That's a real TLD valuable violin."
attend said Bryan He had Virgil bring it
lizzard. down "It's worth thousands of dcl-
he oth-lars and was made by Stradivarius "
till are

Sure enough, the name Stradivarius
was to be seen inside the violin
n feet
Four
If he'd calendars completed the room's decor-
Bryan ations.
man-lo
ceive their 1
Mis Margar
Presta, wante
earth, too 1
dowment fur
tributed ac
never to hav
Calcutta, I
[AD] $2,300,000 fo
storm water
New Si
Neckp
Reno Evening
Gazette
reno, Nevada,
4-9-1931

[PAGE BREAK]

the girl W
d to join him.
in New York,
to the home
ng. They were
settled.
nost destroyed
was discover-
welcome than aiger amounts-
expected to be dismissed from the evening about 6:30 o'clock when the the aggregate they will help m
Woodland Clinic tomorrow. Mr. Engh gasoline tank on a tractor exploded, of the neediest families. Ev
and their daughter, Catherine, also
were hurt, but not seriously. An un- partially damaging the tractor and! ny will be thankfully accepted. Ti
destroying a large truck that was is a three-fold need for a sum
identified truck struck the car in
nearby. The truck was sprayed with larger than it will be possible tr
which they were riding.
flaming gasoline. The accident hap- through the Charity Football G
pened at the G. N. Merritt and Sons Tuesday. The demana- natu
anch just south of Woodland.
treble those of past seasons.
own as the old Giant Eagle Killed
an Ruten pur-
Bart Worley.
lamed for the
nd furnishings
by insurance.

Killian Weidner, 31, who was work-
By Woodland Man ing on the tractor, was severely burn-
ed, while Albert Gavillet, who was
Mark Edgar, local business man, nearby, suffered minor burns. Both
killed a monster eagle in Colusa men are in the Woodland clinic for
county late Thursday. The wing treatment.
spread was six feet 6 inches. He saw
the killer bird in a water ditch and
i did not realize what it was until he
y-Fair tonight had killed it.
URDAY
al fogs and frost Ile offered to donate the bird to'
Both of Weidner's hands and one
eg were Ladly burned. Gavillet
caped with burns on one hand.
entle changeable the Boy Scouts for stuffing and Arm Broken But
mounting.
ni' V.
The directors of the Woodla
Parent-Teachers held a spect
meeting today and unanimous
voted to give 875 toward th
Cheer Fund.
If you care to aid in lightening
hurdeus of our unfortunates, your
es-tributions may be mailed to or
with Chester Gruhler or Floyd St
rock, the cashiers of the Rebel Bo
r with any member of the board
with the "Democrat.".
Today's godsends:
I know lederne
$ 9
woodland Daily Democrat
wood! and, CA
12-4-1931

[PAGE BREAK]

TUR
8. D. McClung, old Ume resident
of Treaton. Ost., is dead.
system adi more of the white collar Conimission proveed
class to their ranks, E. J. Garland. ship of the St. Louls-Ban Franco W. K. C
M.P., UFA. member for Bow River Railway Company, and announced Canadian I
constituency, told delegates to the that plans are under way for bond-identified a
Canadian Labor party at Edmon-holders to take over managenient of
the line for an indefinite period.
R. N. Thorburu, plonear mer ton
chant of Milestone Bask, is dead.
ight and learning," such as
men of position, the one an
nd the other a ruler of the

he teachings of Christ lies in
ght the hearts of all classes of
8 were wont to assemble in
eashore, where He spoke with
d by the mountain side fromi
em. He told them great and Thundar
hich came home to them. It
everyday life, the duty to God
ty to man.
C. R. Bunn is the new president
of the Red Deer Rotary club.
3.
portant Ant
alitutions,
Attacked by an angry bull, John During the past week grain ex- George was
Grean, 60, was crushed and gored port loadings at Vancouver were adian Natio
to death on his farm 20 miles north-1.495.008 bushels, bringing the se
east of Edmonton. Bir. Green, an son's total to 70.057,476 bushels. The to 1008, an
50 year old one in the week ealded in fatal at this time last season was an Misni
the New Lunnon district, near Gib-70.771.289 bushels Elevator locks 14-8. He
are 10,157.435 buahela, with 605,500 Univeralty!
bons, for the past 23 years,
bushels on cars in terminal yards. 1908 to 16
Reform A
E. McCullough, 38-year-old far-and 921,000 bushels en route.
an early p
mer living 10 miles north of Atha-
versity, Ki
baska, was pecked and buffeted into
unconsciousness when he was al-
tacked by a monster cagle near
E. J. Teylor has been appointed
provincis! weed inspector, rith
headquarters at Claresholm.
Christ are often submerged by Alex Neeb, of Hensall, has been
gion in the too great stress appointed registrar of deeds for
e people on these to the danger
Huron coinly.
his home, McCullough declared he
was passing under the tree where
McKinnen Bros' general store at the eagls was nesting when the
sible sign" too often is lost the re.
ning of the religion of Christ. Lellevile, Alta, was destroyed by bird dropped on him.
d and spiritual grace," which,
3. To lose the meaning of this prominent Stratford, Ont.,
Je
35. Ferguson,
whent and ex-mavar. is dead,
former
mexy
Billy Spuren, 14-year-old son of
the Holena chlet or polico, Jos
6purtem, care home from a plenie!

lovad
Neville Chamberlain, Chan-
cellor of the Exchequer,
nounced in the British House
of Commons the Government's
plans for converting rar Loan
Are per cent. bonds to 3 per
The converslon is ex-
CRAL
pected to result in a gross BY-
to the Government of
ing
about £30,000,000 (approximately
[AD] $108,000,000) during 1933, al-
though this will be reduced by
Dr. J. H.
cma Stee
one of th
In the hist
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rolls at the
Power
Co
Marie. Di
station el
charge th
had t
Lethbridge Herald
Lethbridge, Alberta, Canada
7.2.1932

[PAGE BREAK]

Decause of differences in cranial shape and limb proportions. William Jungers and Susan Larson of the State University at Stony Brook (New York, United States) have analyzed hobbit postcranial material at recent paleoanthropology meetings. They have found limb proportion convergences with Lucy, the most famous member of Australopithecus afarensis. Still, they say, shoulder characteristics more closely match early H. erectus. At least a genetic link to H. erectus is not geographically outrageous, H. erectus had been in the region for nearly 2 million years; in fact, the type specimen was found more than a century ago on the Indonesian island of Java.

What is a hobbit?

But, unlike big-brained erectus, whose brain was 75% of the size of ours, there is no evidence whatever that small-brained Australopiths (35% the size of ours) ever ventured out of Africa-let alone invented boats and sailed off to Indonesia more than 3 million years ago. The Argue et al. paper speculates on ways very early hominids might have migrated to the region. Something like this astounding seagoing scenario a really, really ancient mariner-seems to be

required if H. floresiensis had Australopith ancestry.
Hawks speculates that this quandary might go away if we knew more about the environmental and developmental factors that determine human body size. "We have no idea what explains body size, and the hypotheses about this are not compelling."
Maybe LB1's pelvis looks Australopithecine, Hawks suggests, not because the hobbits descend from a seafaring Lucy, but because that's what the pelvis of a very small human biped looks like. "It has the virtue of not depending on external events to explain it," Hawks says. "It's just a consequence of being small. You still have to explain why they're small. If we knew why growing big or small was advantageous, we might learn whether island dwarfing applies to people as well as elephants.
Richard Potts of the Smithsonian Institution (Washington, DC, United States) suggests something similar. What would happen, he wonders, if an carly, smaller-brained erectus was subjected to island dwarfing? Would ancestral Australopithecine features emerge, perhaps as a result of changes in fetal development? "We'd like to know that, but you know, we just don't."
Were Hobbits Toolmakers?
The debate over the hobbit brain has been fueled by stone tools found at the site. A commentary accompanying the original two papers suggested that some were like tools associated elsewhere with modern humans. This suggested to others that hobbits had a complex culture.
Stone tool experts, however, say the tools are not particularly sophisticated. They are simple, made using techniques that hominids have used for millions of years and humans are still using today.
A team led by Adam Brumm of Australian National University has tried to show that hobbits were part of a line of Flores tool makers who had been chipping sharp flakes from stone for upwards of 700,000 years. The researchers based their analysis on more than 500 stone artifacts excavated at another Flores site 50 kilometers from Liang Bua and dated between 800,000 and 740,000 years ago. No erectus remains

have been found on Flores so far, but paleoanthropologists assume they made and used the tools. The paper compared the very old tools with those found at Liang Bua and noted specific similarities.

The Flores tools are unique but also simple, according to Potts. "The tools we see on Flores, the older as well as the younger, cannot be exactly matched with anything that's known anywhere else" he says, "but the overall strategy of the technology and the overall size of the materials is consistent with what we find in mainland China."
Harold Dibble of the University of Pennsylvania Museum agrees. They would fit perfectly at a million-year-old site, he

says, but also are a type made by native Australians today. "These are simple tools," says Dibble, "Could they have been made by a small brain? Sure."

The Politics of Hobbitry

H. floresiensis debates have been marked by a degree of acrimony that may seem excessive and even a bit scandalous to outsiders. But a number of paleoanthropologists opine that it's pretty much the usual fossil furor-even though it's been punctuated by public name-calling, a high level of rancor, and exceptionally gaudy episodes like the hobbit bones' unanticipated travels.

"I don't think there's anything special about this dispute except that it's taking place in a particular cultural context of Indonesian politics, which science gets drawn into, just as it does in every other country, at least certain fields of science," says Potts. "There are aspects of etiquette and the way of treating other people that may represent a bit of a clash between the Australian principal investigators and the Indonesian science community, which tends to be a little bit less, well, freelance about such things. I think that there may be a bit of a culture clash there."

There are also other theories about LB1 and compatriots. Holloway, for example, says he hasn't given up on his notion that hobbits may have been taken care of and kept as pets by other Flores H. sapiens, "sent out to fetch the wood or the occasional dead rat, bring it back, whatever!"

The most extreme proposition comes from Schwartz: "It's an interesting assemblage of bits and pieces that probably represent different kinds of hominids and maybe even some non-hominids," he argues. "It's more interesting to me that there might be these different morphologies represented, and the implications of that, than to do a Rube Goldberg hominid and say, 'Look how weird this is."

"To be very blunt, this is just stupid," says co-discoverer Peter Brown. For example, he explains, LBI's arm articulates with the skeleton, meaning they are from the same individual and not different taxa. But Brown thinks LB1's skeletal proportions and brain size are unlikely to be due to dwarfing of H. erectus. Instead, the most likely ancestor of H. floresiensis was small-bodied and small-brained. "This is not the same as saying the ancestor was an Australopithecine."

DNA analysis might help, but prospects are gloomy. The site is hot and wet, perfect for destroying genetic material. There's been at least one effort to find DNA in hobbit bone, carried out in the lab of ancient DNA specialist Svante Pääbo of the Max Planck Institute (Leipzig, Germany). It failed.

So on present evidence, the debate about whether hobbits were a different kind of human or simply deformed can't be settled. It is even possible that both sides are partly right.

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LARGE EAGLE KILLED
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GLOVES
Albuquerque Journal
New Mexico
12.10.1932

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State Supreme Court Holds Pension
All Over 65
Will Be Paid
Immediately
> Judges Hold, Adding That
Supplemental Legislation Need-
ed for 60-65; Pension Fund
Must Now Be Created
(Associated Preen)
Denver, Jan, 20.-The Colorado su-
eme court upheld today the con
itutionallty of the $15 old age pen-l
all amendment and declared it now
effect to the extent of creating a

"Dead" Eagle, While Being Measured,
Grabs Grover Man's Leg with Talons

Grover, Jan. 26.-Willam D. Woodard, Grover mall carrler, while out hunting Monday saw a large eagle flying around with a live rabbit clutched In Its claws. He brought the big bird down with a well placed shot from a 22 rifle. Thinking the eagle killed by the shot and fall he threw it in the back of his car and drove over to the Henry Hillman ranch where he and Victor and Henry Hillman Jr., still thinking the agle dead stretched it out on the ground to measure it. Suddenly the eagle leaped into the air and sank its talons into Woodard's leg Just above the knee; plercing a pair of heavy corduroy trousers and ontering the flesh nearly an inch. It took the combined efforts of the three men to force the cagle to relcase its hold. The big bird measured seven feet and four inches from wing tip to wing tip. Mr. Woodard will have the eagle mounted and will keep it and a badly lacerated leg for souvenirs.

60 Fieldmen
Told of Soil
Saving Plan!
Crop Workers of Sugar Company
Hear Ag Expert; Much Expect-
ed of Scheme, N. R. McCreery
Tells Group Here

The 1937 suil conservation program should accomplish more in one year than has been accomplishod In the past ten years in encouraging crop I'D tation and achieving the benefits of rotation, N. R. McCreary, Colorado manucer of the Great Western SuCar Bus in Which 17 D

Greeley Daily Tribune
C curado
1-26-1937

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In The Past
15 YEARS AGO TODAT
January 10, 1821

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Churlotte Marie, returned last
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Georgetown-Loyola football game
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Aggle game at Memphis, the Ala- tend to preve
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ne at Tuscaloosa
Mrs. L. A. White, in charge of
he millinery department of Levi's,
s left for the Eastern markets.
Mrs. Evana Bradshaw's pupils
will present an interesting recibil
ut her residence Tuesday evening
47 YEARS A
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age 86, widow
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One day last week a viester
eagle swooped down into the back
yard of Mrs. J. C. Davis at 704
Main street and helped himself to ton aged 72.
a chicken and was preparing to William Th
take a second when Mr. Rousseau London.
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captured the big bird which meas-American sus
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25 YEARS AGO TODAY
January 10, 1914
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from a visit in friends in Raton
Delt a Democrat Times.
Greenville, Mississipp:
1-10.1939

[PAGE BREAK]

JACKSON. Tenn, Dec 22-Thomas
Oaston, captain of the police, killed W.
C. Strickland, Wednesday morning. The
tragedy was the result of a card pub-
lished in Tuesday's Evening Times over
the signature of Strickland, making se-
rious charges against Gaston's official
conduct
The y en Unaltered.
Bow, Dec. The emissaries of the
French royalists have utterly failed to
induce the holy see to alter its present
friendly feeling toward the French re-
publie, a feeling that has characterized
the policy of the vatican for the past
two years.
A Fatal Experime it.
GOSHEN, Ind., Dec.
2-Rufus Den-
learned by the electrocution of ten men.
reluces and does away with all pessi-
bility of any burning, scorching, etc.
A Dater."
MEMPRIS, Tenn., Dec. 22.--Residents
near Montgomery park are in a state of
feverish excitement over the appear-
ance of a ferocious and misshapen mon-
ster which they call the "dog-eater."
It is said that the mysterious beast
looks like a calf, and that it has fetters
attached to its neck that clank with its
every movement Its method of killing
a dog is to bite its head off. It is sup-
posed that the dog-eater is an escaped
panther belonging to some menagerie.
Outlaw Gang Wiped Out.
Fr. SMITH, Ark., Dec. 22-Stan Rowe.

the natione outlaw and dona
Sun. made its appearance her
day night. Its avowed objec
rocate the annexation of Can
United States. In its salutator
"We have no hesitation in si
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entirely due to our unhappy
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With England we have no qu
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Suleide Fuertel's Fa er
ST. Lotia, Dec. 2-The f
Edward Foerstel, late assis
treasurer, who committed sui
Hamilton Daily republican
Hamilton, Ohio
12.22.1892

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TRENTON EVENING TIMES, THURSDA
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Resembles Hyena
CHURCH POINT, LA. June 3.-Now.
ton Barurse found that his mule colt,
which was horn the day before. had
heen killed during the night. The ar-
was partly devoured Ail of the
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and part of the shoulder were eaten.
Mr. Harusse was unable to account for
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lested.
sted, and decided to lie in wait the
allowed the carcass to remain unmo-
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anticipation WAR realized.
that night at about ten
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1 kw the animal approaching
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a
In the darkness Mr. Rarousse hur-
riedly examined the animal, and left it
for a well sized dog.
The following dag J. F. Daigle passed

by the rarras, and after rinse observa-
tlon he pronounced it a cross between
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number of people have examined the
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body, and nearly all pronounce it a
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R. B. Boettcher and Edward Dalgle
drove out to make an examination of
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The animal was found to
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four feet long, one and a half feet high
In front and fully six inches lower In
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ce of cloping toward the hack
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the West Texas coyote, says the animal
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except it is larger.
Some rall
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une 9. think
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animal killed a wolf.
Lisa hyena, while some

it is a ratamount, but all agree
It must be the famous "dog eater."
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heen some wild beast running at large
ary, put in this community, attacking dogs and
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young man riding along in his huggy,
re than and lately this animal was seen scv-
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Dog-Eator" in Traurasoc.

MEMPHIS, Dec. 22-Rillante war)
Montgomery park are in a state of fer-
erish excitement over the appearance of
which they call the "dog-inter."
a ferocious and inisshapen monster
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said that the uysteriousbust looks like
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UNCONQUERABLE.
is to bite its head off. It is supposed
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Nothing Now at Hourentand.
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C■IBABA, Mex.. Dec. 22.-Th
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PITTSBURU, Dec. 1-There was noth-suppress the Yaqui and Mure Indian up
Cases yesterday. Attorney Burligh
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Hou. The Ilians, to the number o
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Lima Daily News
Lima, ohio
12-29-1892

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IN STOCK.
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LC. Caldwell, Al's.
Juno 2, 1900.
JABRILL

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TORTH CAROLINA, In the superior
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.A. Renagers. William erantel, Frauk
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NOTICE.-The defendants above name will
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Stony Point, . C., July 7, 1900.
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J., Connelly, Att's.
Juno M, 190)
J. A. HARTNE
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Every month silds to nar list of aud
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overy shop, ofico and loro in town.
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AUVERTIMENTS.
Arrest
disease by the timely use of
Tut's Liver Pills, an old and
favorite remely of increasing
Popularity. Always cures
SICK HEADACHE,
sour stomach, malaria, indiges-
tion, torpid liver, constipation
and all bilious diseases.
TUTT'S Liver PILLS
J. A. COOPER, Pron. J.O. IBYIN, Vice 1'ron.
GEO. B. BROWN, Cashier.
Capital, $50,000.00.
Merplon and Unilivided Prants. 813.000.
Mr. H. P. Grior, Kennedy's school mL –1 N-
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CASH & SIGHT EXCHANGE
CH. RIVES.
709.75 Surplus.
8,495.84 Undivided profits (less ex-
104,788.86 Penses paid).

DEPOSITS.
[AD] $324.028,56
THE ABOVE STATEMENT IS CORRECT.
President M.'R. CHILCUTT, Active Vice Prest.
[AD] $50,000.00 DOOK OL Instruction. D. C. D. 19 gola
everywhere by drug stores, department without dogs.
5,000.00 and general stores.
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H. P. REIC8, Cashle
Want Ads
TERMS CASH. One cent a word for first Insertion. One-ba
cant a word for subsequent Insertions.
No classified advertise
ments accepted for less than 15 cents. Telephone your want ads to
Number 4. If the advertisement has to be booked, one
word per Issue will be charged.
cent per
Telephone Us Your Want Ad Now!
Want Ads
DOG-EATER IS A BLESSING
Flushing Man Wants Nescopek's Mye
terious Monster - Many
Canines Destroyed.
Nescopeck, Pa. An echo of the ex-
altement here lacident to the visits
of a dog-eating animal has come in a
FOR RENT-Nicely furnished 6-room
telegram from Flushing, N. Y., an Au-
house for rent cheap during the sum-burndale man wanting the monster if
mer. Have plans. Phone 302. 301f Nescopeck rails to appreciate the
CITY LOANS-Straight years, semi- blessing It has received.
anual or monthly payments. No catch
plans. Rellable Fire and Tornado In-
surance properly written. Ebay &
The dog-eater bas been causing
havoc among the canine tribe 'by
nightly luvasions, but as yet Its real
identity is a mystery. All it does la
14-du to destroy dogs.
Harrison Bros.
FOR SALE OR TRADE Five room That Nescopeck has had a pectat
house. Cheap. Write J. L. Miles, Wood-dispensation of Providence in the
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29.261*
coming of this terrifying dog-eater la
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SINGLE COMB REDS-Vigorous stock
dent, and from whom Burgess mith,
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jeed; eggs $1.50 for 16. John Thrash- dog-eater be shipped to his home
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Every letter sent
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NEW
Evening News
Ada, Oklahoma
5-13.1913

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TRENTON EVENING TIMES, THURSDA!
IP FIND AN ANIMAL
SION! THAT EATS DOGS
Gover- Creature Shot While Feasting
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CHURCH POINT. LA. June 3-Now-
e Grand ton Barousse found that his mule colt,
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CAR WAS partly devoured All of tha
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After being wounded the ani-
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R B Boettcher and Edward Dalgle
drove out to make an examination of
the carcass. The animal was found to
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¡RAILROAD CASE
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Trenton Evening
Trenton
News
6-9-1910

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n Die w und no trace. BIT. MOr
d offers a reward for information.
A l'olles (aptain omnits Murder.
JACKSON. Tenn, Dec. 22-Thomas
ston, captain of the police, killed W.
Strickland, Wednesday morning. The
gedy was the result of a card pub-
ed in Tuesday's Evening Times over
' signature of Strickland, making se-
us charges against Gaston's official
idact
The oly San Canitered.
Low, Dec. -The emissaries of the
och royalists have utterly failed to
luce the holy see to alter its present
endly feeling toward the French re-
blie, a feeling that has characterized
polley of the vatican for the past
D years
A Fatal Experime it.
HOSH, Ind., Dec. 2-Rufus Den-
of Napanee, attempted to beat a
contact was sufficient not only to make
life extinct, but this modern appliance,
which has grown out of experience
learned by the electrocution of ten men.
reduces and does away with all pessi-
bility of any burning, scorching, etc.
A Deg-hater."
ME■PRI8, Tenn., Dec. 22.--Residents
near Montgomery park are in a state of
feverish excitement over the appear-
ance of a ferocious and misshapen mon-
ster which they call the "dog-eater."
It is said that the mysterious beast
looks like a calf, and that it has fetters
attached to its neck that clank with its
erery movement Its method of killing
a dog is to bite its head off. It is sup-

posed that the dog-eater is an escaped panther belonging to some menagerie.

Outlaw Gang Wiped Out.

Fr. SMITH, Ark., Dec. 22-Stan Rowe, the notorious outlaw and desperado,

A New (a adlan nexation Organ.

TORONTO, Ont., Dec. 2.-The first issue of an evening paper val ed The Sun, made its appearance here Wednesday night. Its avowed object is to advocate the annexation of Canada to the United States. In its salutatory" it says: | "We have no hesitation in saring our lack of like progress has been and is entirely due to our unhappy separation from the republic of the United States. With England we have no quarrel, nor are we unmindful of her great services on behalf of human freedom, but our hearts and energies should be devoted to improving the condition of our own people.

Sulelde Fuertel's Fa erat.

ST. Locia Dec. 22-The funeral of Edward Foerstel, late assistant city treasurer, who committed suicide Monday, took place at 11 o'clock Wednesday

Hamilton Daily
Republican
Hamilton, OH
12.22.1892

[PAGE BREAK]

rd of before, things that

ith the strange silvery MAKES ITS HOME IN

onlit splendor. There

usic this summer.

Bho

d this girl who came

eastern borders. Per-

juld marry before she

me.

DESECRATED GRAVES

He was masterful. Mysterious Beast Rends Coffins and Scatters Human Bones

-Roars Scare Women.

Licked Lame Bear and

out bls business even

she wished the Indian

1 suddenly and saw the

her from the rock above.

down full length on it,

ao palm, her eyes un-
a panther, for all the
hought with a shiver.
you beeu, Kit?" ahe
> be natural and pleas
lown here, won't you?"
her head slowly. Her
0700 looked sad and
looked down at the
Sloane stood mending A
on bis saddla
o see Lame Bear get
she Bald dreamily.
le will come
He is just
rriage sheds now, creep-
up like a thunder cloud,
ed the girl, too horrified
he looked for Dave, but
peared the other way
house. "Kit, you're not
le lan't there."
to her as she scrambled
and smiled gravely.
TO. I sent for him to
I wan't to hear news of
'ou know who my people
ted for the girl's shoul-
>k her an if to make her
ine. As she rolled over,
el of her rifle lay on the
uncolled snake, straight
be an idiot," she said,
u've set him on to kili
up at her, close lipped.
I see him kiss you last
und long. You can kiss
etty soon I let you."
1 cat!" It came between
She struck blindly, try-
the girl to one side, and
knew she wanted the
knee was on her breast,
ying to grip her wrists.
estnut hair slipped down
ce. She gave a cry of
felt Kit's teeth sink in-
She dared not call for
1ot shout a warning for
ar would be the first to
e loosened her grip on
rose to her feet, the ride
to get up, I'll shoot you.

■ anything." she said
"I will" Then sho
fle with steady Dngers at
g. creeping figure that
It the back of the sheds,
shelving hillside Dave
er to shoot well her Orst
anch, but her Angers felt
er eyes were blurred or
the sunlight Still sho
bot, abot again and again
Is were empty, desperate-
, at the stealing figure.
opped the rifle, and coT.
with her hands, sobbing.
aised her head, Kit was
just what I expected."
a said when she came in
I of broth to Al "It
goings on for one day
verine to have
Da dia-

Shelbyville, Ind.-The most uncan-
By sensation that has stirred Shelby
county in recent years bas taken a
Arm grip on residents near the Patter.
son cemetery, east of Lewis creek.
Graves in the cemetery are being de
apolled by some animal or agency.
and none of those who has taken an
interest in the situation has been able
to solve the mystery.\
Burrowing into the graves, the benot
rends coffins, scatters bits of broken
wood, apinal columus, arms and leg
bones on the surface and roars like a
lion when intruders approach too near
the scene of its operations. At Arat
the belief prevailed that woodchucks
Graves Were Being Despolled.
were doing the work, but this theory
has been abandoned, as none of the
animals have been seen in the ceme
tery.

•COMF
"I ha
Tha
"Yes
expose
day, a
take it
A
Mr1

"I have
for ton
done I
Pills c
Troubl
Dow to
am 77
at libe
and y
nection
Smith
Dodi
your i
Duffal
Hints,
(Engl
pes fo
Adv..
Hen
Amerl
P
■ rece
"Qa
had 11
day a
The situation was first discovered
by women who went td the cemetery
to put some graves of relatives in bet
condition
ter
They discovered
great hole in one of the graves. They tor of
started to investigate, but were greet-key w
ed with a roar from the grave which banke
sent them from the cemetery with Chally
quickened steps and blanched faces
They have not since returned
Men of the neighborhood then went to
the cemetery armed with picks, shov-
They found bones and
els and guns.
pleces of comne scattered over the of mu
They dug into several a bet,
graveyard.
despolled graves and found they had row's
been used as the home of some animal,
but they have been unable to deter-
mine its species
d■ter-
which
"M
yeater
Signal

ExB
CAST
The work was pursued with vigor infmat
until the men struck a grave where it
Bea
was feared the despoller was at work.
There the men lost their nerve and
badly In Us
Bome declared they were as
The work Child
frightened as the women.
of trying to unravel the mystery Is
Btill on and the despoller. Is as busy
as ever..
"Bll
anvy
above
Stevens Point Daily
Stevens
Point
3-17-1913
Wisconsin
Jovina

[PAGE BREAK]

THE
KINKAJOU
IT MAY BE
SPECULATION
STILL, IFE
TO WILAT STILANGE ANIMAL
DAY HE ROAMING,
As
foolish suggestion of all is that the
Baleal ta a malacopoda. Now who
In the world would ever imagine that
a malacopoda would ED bothering
around In this part of the country?
01 all the animals of raore or less
wildness that this one is apt to bo
It may be positively stated that the
A JOLLY TIME
AMONG ELK
malacopods is the least apt, and pe- THEM ANNUAL OUTING
ple who have been brought up with
particular fear of the malasopoda
Instilled in their natures since nar
lest childhood are urged to have no
further fear im this score
And ta the same manner
there
SOUTH PARK AND THE

BVENING DANCE
would appear to be no palcular DAY AND EVENING OF PLEAS
IN THE VICINITY ARCUND MANSFIELD reason why the koala, the arula, the
eacomixie, the rhinelopid and the
plerodactrl should not also be dis-
missed with a mere mention
All Barts of Sporting Stants, In
ding Base Ikill Game and Var
flut the Nolses It Makes, Arcording! But with all of there out of the way
laces and Diversions Tal
To Vernclous Wine, are we the real identity of the wild animal
Jaspiring and Hand-Carding-which has brought on such a reige the Elk Hote at Night-Prox
Thought to be Changing Ite of terror amoos tue people living in of Events and the Various Wir
the vicinity of the ucrtheast part u
Although the day began with
the city, remains as much of a my
and it secined that the "clearfor
tery as ever and the people who
the a oaly temporary, the local
have beard the noises made by
Least refuse to be convinced. that had a delightful day for their ou
ther have simply "been bearlag ca Frida), and despite the a
things" and insist that there is In from the city of many of the F
Of Operations to the Southeastern
Section of the Tonaship.
On the very face of l, it
seems
Ike the quintessence of absurdity to
Imaglen for a minula that such an
analas De Kinkajou could have ground for their feats pnd the slaying Azay of ma
wandered from its native benth and
Thus far, however, the animal-
If there really is an animal-has been case of the threatening weat
come into this county, in fact late suficiently crafty to avoid all of the lover two hundred members of
this immediate vicinity, without hav-j meny hunters who have been on the ludce. Ita their familles and l
Tug Leen cetected and dispatchet lookout for LOW LO havn n-aking a company of between
kept itself concealed In some of the and 300, enjoy In aftern
while it was on lin way
Tet many of the people who have early woods during the day, only South park after the most appr
enturing out after nightfall in orde. tasilca.
Len startled t the awe-tririns to sadsfy its appetite and it would
Dotses which have reeued to emanste area that on theen noctural viafts
from the throat of some wild Senil. lis detotes practically all of ita
which it is claimed ban teen causing attention to the chicken roosin and
LOOKS LIKE A TAGGEIL"
the
All of the committees had
good work to make the event a
vest and it was such in every res
The afternoon was sent la raj
nasumes and sperts, and about
m. supper was lal on long u
In the gro And it was a good

per, luu Every Ek will testify
lila wife la an expert in provi
good things to eat, and when the
certed efforts of all these ladies
read on the festal board ca
imagine the result.
Old Eiks and young Elks
there. The men of familles, the t
eler and their best girls, the te
rarily "bachelor hall" contingent
Toys and girls, big and little, all
une happy family were there not
Letify that the event was an e
auk one
There was a long till of sport
which prizen were awarded and t
pop-contests aroused much exciteme:
well as antenient, the completi
cold chills to run up and down the a number of the residents of
spinal column of the residents of fan lefested can attest la fond-
the vialaity just northeast of the mess for a poultry diet by a notice
city, have reached such a degree of aule shortage in their chicken
nervousness that they would not be alation.
greatly surprised If a kinkajou of the
very Barvest kad would ddrab
spring up theta.
The mere tdes of there being an
animal of this kind in this section of
the country is eccugh to cause any
ote to gasp with fear but the danger
means than the News has at Its h
al, to that the prorramme, with
her, manat authee. It was
lova
There was an unauthenticated re-talls of which would fill more
port fonding about Saturday that
sounds not unlike the produced br
the animal which is supposed to
making Its headquarter northeast
ai the ells, had been heard by peo-
ple passing along the road autheast
Is not particularly iniminent in view of town and it was thonght possible
of the fact that eren A. J Bangb that this same mysterious beast bad
man fails to remember ever taslag sought n nes palure, but the in-
EVENT NO. 1
Guessing Contes
For Men-Prize, walking
Mua ly a 1 n Reynolds.
Tar Indlet-Prize, set candel
seen an animal of that sort in this formation. nt hand is too vAZES (OUD by Catherine Fard.
section of the county or in the vi-carry much weight.
elaity of Bellville.
Equally improbable is the neser

tion of some others that the animal
In question is nothing more or less)
WORKING AT $1.50 A DAY
than a toplomys, and it is hard to As Jarurs While Paying red Lands
see why people should make asser-
tions of this kind or even give cred-)
ence to a story that there la any kind
of an unusual saimal running around
so near to a thickly populated com
alty as this in
Rut even at that, it is n Titile bard
6 a llay.
The case of Rulley Asbaugh v. the
beard et Richland county mmsalon
ers et al, the proceeling to ass
damages for the destruction of the
mere or less fammons Campbell mill
dam, southeast of the city, har bega
to doubt the reliability of so many tried a secuud uime and it is to be
Teracious citizens as claim to bave hoped that no error will be frund tr
the proceedings this time, as It reeins
EVENT NO 2.
Dase Bell Gar
Waning team prize. box
gars. won by Jay Dirlam's nice.
Luting team. prire, nine dne
uns, won by H. W. Hartean's nir
Fenre 18 to 11. 6 innings
EVENT NO. 1. -
liunaing races-
Men under forty, 100 yds, 1
air cuspenders, won by Jay Di
Men over furty. 150 rds: :
stein. won by Jacobs Itinehart.
(Jake says he's culy 27).
For ladies. 50 yds, prize. allver
receiver wop y Martha Gibeon.
EVENT NO. 4.
Elepping cutest (blindfolded)
For men, 60 pares, prize, anc
set. won by L. Fruendlich.
For ladies, 40 paces, prize na
la. won by Mrs. Jacob Rinehart
EVENT NO. 5.
Stake race-
For men, price, necktie won L
L Slovens
For ladies, prize. silver top po
tox, won by Mr. H. N. Redding.
to cost the cDLY more money in the
way of damages when a new trial is
bad to say nothing of the increased
roste which are saddled ea Another

thing about the mattPT t that the
prosecuting attorney cannot get any
extra fees these days for helping to
in which the county is later
ested. The allarneys for the land.
owner certainly hat things comine
their way at this recood trial in the
first place the threatened to have a
range of venne and have the casu J
Iried elsewhere. The result was that
the jury was entirely composed of
farmers, or men who are residents
skie of the city. One man who hail
been a farmer, but who in new living
at Bellville, was on the jury, but all
The rest where almon pare farmer
This certainly made it a lopsided fury
In tavaf of the landowner on the fan:
of the proceedings. The Jury gri the
case along alt 3 o'clock la the af
ternoon. As they all wanted to get
home that night, it war arranged to
pay them off then and there before
Leard the roaring. marling, whining the retired to delibertair for the reas
beast gallivanting around while they on that when they get through with
were on their way bome. or rousies the case the Intaster's office would
them from their slumbers by oremilkely bave bora cla and they
las to come foto their very dour-wld not have been able in gel bel
Jard.
When the Jurymen put their
IT MAY COME TO ITS
money
But what would seem like the most ey there was a bowl of large and
PASTY FOOD
The Commrobly red.
EVENT NO. 5.
Lean men a race(fal men d
Lave enough to 130)
Prin travelling Eask, won 1
W Fanst.
EVENT NO. 1,
Ball throwing coolest-
Mea's prize, tobacco jar, wo
C. B. Umbrell
Ladler prize card car, wo
its Martha Maxwell
After the pleasurable after
and the supper at the park, the a
cakers adjourned to the city as
the Elk home where the
was devoted to terpelchorean
proportie 11 neems that the en pres cards and olber diversions.
provides in this class of condemnatlen! And prizes were awarded here

cases that the Jurym shall recel There were dancing contests
[AD] $1 per day, bormay the regular way many couples put the best
Jarman gets $2 per day. The forward. kept the judges busy t
kicked long and hard an account of
Waitz-
To realleman, price, pocket l
Harland M. Wirth.
The use of parts cereals is not ad- the size of their checks. They stated cide apea the winners, but a
virable. A physician says: Tasly that la the first place this is a very were finally made as follows:
ereals are very totisestile and a busy Ume of year for them. Some of
bad thing for the stomach, rast them had harvest hands working
depressed feeling and quite a train of them at the rate of 2 per day, while
alsorders particularly of the laic they, the owners of the farms, were on
times and serTex
the Jury at Mansfeld for four days al
"Cerrals, such as wheal and ale rate of $1.74 pray.
can be cooked gough and well the jury men kicked pretty hard shout
enouch to fit thera fer hunen ase, but the slan of their stipends they Ert no
The ordinary war of cooking leaves (more and were finally chaset tato a
them in a pasty conditio
Although
To lady, Miss Mary Small,
Two blep-
To lady, prize, tooth break b
Mr. J. J. McIntyre.
To gentleman, prise, pair wir
m where they deliberated two ders. B. Curke Drown.
A falass man s "My heure before returning a rerdict Is To couple appearing to best a
dan punhibited the ura of oats and was the first (lane a Jury has been nalu tace in the two step-
Mansfield, ohio
Mansfield News
8-17-1907

[PAGE BREAK]

KINKAJOU
IT MAY BE
SPECULATION
STILL RIFE AS
TO WHAT STRANGE ANIMAL
foolish
animal
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MAY BE ROAMING,
furthe
And
would
IN THE VICINITY ARGUND MANSFIELD
re:.501
cacom
pteroc
misse
But the Noises It Makes, According.
To Veracious Witnesses, are we-
Inspiring and
Blood-Curdling-
But
the re
which
of ter
Thought to be Changing Its Base
the vi
Of Operations to the Southeastern
Section of the Township.
the ci
tery
have
On the very face of it, it seems beast
realit
Thi
like the quintessence of absurdily fo they
imagine for a minute that such
an thing!
animal as the kinkajou could have
wandered from its native heath and
co■e into this county, in fact Intu
this immediate vicinity, without hav-| many
ing been Getected and dispatched looko
while it was on its way.
Yet many of the people who have
Leen startled by the awe-inspiring
if the
suffici
kept
nearb
1 entu
to sa
noises which have seemed to emanate appea
from the throat of some wild beast, is di
which it is claimed, has heen causing atten

[PAGE BREAK]

argument think there
Hobbits are so different from anything else in the hominid
record that calling them a new human species is by no means

crazy. But even some scientists who buy the new species may have been something wrong with LBI and that the much-disputed brain is indeed abnormal. What is the hobbit? "I don't know," Holloway admits, and he has plenty of company. But, he observes, the puzzling hobbits don't change the major outlines of human evolution. "I think it's sort of a side issue.

Further Reading

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[PAGE BREAK]

LOOKS LIKE A "TAGGER."
cold chills to run up and down the a number of
spinal column of the residents
of
section infeste
the
of
the vicinity just northeast of
city, have reached such a degree
nervousness that they would not be
greatly surprised if a kinkajou of the
very fiercest kind would suddenly
spring upon them.
The mere idea of there being an
animal of this kind in this section of
the country is enough to cause any
one to gasp with fear but the danger
Is not particularly imminent in view

of the fact that even A. J. Baughman falls to remember ever having seen an animal of that sort in this section of the county or in the vicinity of Bellville.

Equally improbable is the asser-i tion of some others that the animal in question is nothing more or less than a loplomys, and it is hard to see why people should make assertions of this kind or even give credence to a story that there is any kind of an unusual animal running around so near to a thickly populated community as this is.

uess for a po
abie shortage
ulation.

There was
port floating
sounds not un
the animal w
making its h
of the city, ha
ple passing al
of town and i
that this same
sought a new
formation, at
carry much w
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WORKING

As Jurors W

The case of
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tried a seconc
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But even at that, it is a little hard to doubt the reliability of so many veracious citizens as claim to

IT MAY COME TO THIS.

heard the roaring. snarling, whining beast gallivanting around while they

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prosecuting att
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ested. The att
Owner certainl
their war at tl
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been a farmer
at Bellville. w
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in favor of the
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they retired to
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proportions.
provides in thi

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PNAS PNAS

Brain shape in human microcephalics
and Homo floresiensis

Dean Falk**, Charles Hildebolt, Kirk Smith*, M. J. Morwoods, Thomas Sutikna", Jatmiko", E. Wayhu Saptomo,
Herwig Imhof, Horst Seidler**, and Fred Prior*
*Department of Anthropology, Florida State University, Tallahassee, FL 32306; *Mallinckrodt Institute of Radiology, Washington University School of
Medicine, St. Louis, MO 63110; "Archaeology and Palaeoanthropology, University of New England, Armidale, New South Wales 2351, Australia;
Indonesian Centre for Archaeology, Jl Raya Condet Pejaten No. 4, Jakarta 12001, Indonesia, Clinic for Radiodiagnostics, Medical University
of Vienna, A-1090 Vienna, Austria, and **Department of Anthropology, University of Vienna, A-1090 Vienna, Austria

Edited by Marcus E Raichle, Washington University School of Medicine, St. Louis, MO, and approved December 7, 2006 (received for review
October 18, 2006)
Because the cranial capacity of LB1 (Homo floresiensis) is only 417 cm^3, some workers propose that it represents a microcephalic Homo sapiens rather than a new species. This hypothesis is difficult to assess, however, without a clear understanding of how brain shape of microcephalics compares with that of normal humans. We compare three-dimensional computed tomographic reconstructions of the internal braincases (virtual endocasts that reproduce details of external brain morphology, including cranial capacities and shape) from a sample of 9 microcephalic humans and 10 normal humans. Discriminant and canonical analyses are used to identify two variables that classify normal and microcephalic humans with 100% success. The classification functions classify the virtual endocast from LB1 with normal humans rather than microcephalics. On the other hand, our classification functions classify a pathological H. sapiens specimen that, like LB1, represents an 3-foot-tall adult female and an adult Basuto microcephalic woman that is alleged to have an endocast similar to LB1's with the microcephalic humans. Although microcephaly is genetically and clinically variable, virtual endocasts from our highly heterogeneous sample share similarities in protruding and proportionately large cerebella and relatively narrow, flattened orbital surfaces compared with normal humans. These findings have relevance for hypotheses regarding the genetic substrates of hominin brain evolution and may have medical diagnostic value. Despite LB1's having brain shape features that sort it with normal humans rather than microcephalics, other shape features and its small brain size are consistent with its assignment to a separate species.
virtual endocast
Microcephaly ("small head") is a condition in which adults typically achieve brain masses of 400-500 g (or cubic centimeters if cranial capacity is used as a surrogate for brain size) and are moderately to severely mentally retarded (1-15). Affected individuals have been reported from all over the world, frequently from consanguineous unions (9, 10, 16-26). Traditionally, the terms "primary microcephaly," "true microcephaly," "microcephaly vera," and "primary autosomal recessive microcephaly" (MCPH, MIM #251200; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) have been used to describe individuals who were born with abnormally small brains, sloping foreheads, and prominent ears but lacked other "neurological, growth, health, or dysmorphic findings, and [had] no discernible prenatal or postnatal syndrome or cause, such as an aberrant chromosome or structural brain anomaly" (16). [Because MCPH directly affects neurogenesis rather than growth of the skull, some prefer the term "micrencephaly" (27).] MCPH has been distinguished from microcephaly that is acquired or "secondary" to degenerative brain disorders. Since 1998, however, at least seven autosomal recessive microcephalic loci and five associated genes have been identified [see supporting information (SI) Table 2], and all of the general maladies

that, by definition, were previously excluded from MCPH have

now been observed in one or more affected individuals (see SI Text). Variable phenotypes are occasionally correlated with particular kinds of mutations within a given gene [e.g., deletions are generally more severe than duplications (28)] and may be representatives of a continuous phenotype (13, 20, 29). Even the signature sloping forehead of primary microcephalics is occasionally lacking in affected individuals (17, 24) (SI Fig. 4). Primary microcephaly is therefore a genetically and clinically heterogeneous condition that begs the traditional "diagnosis of exclusion" (13, 25, 26, 30).

Given all of this heterogeneity, are there any features other than small size that distinguish microcephalic brains from those of normal humans? To address this question, we compared three-dimensional computed tomographic reconstructions of the internal braincase (virtual endocasts) that reproduce details of external brain morphology, including vessels, sinuses, some sulci, cranial capacities, and shape (1) from a sample of 9 heterogeneous microcephalic humans and 10 normal humans (Fig. 1 and Table 1). Because of the controversial suggestion that LB1 (Homo floresiensis) may have been a microcephalic Homo sapiens rather than a new species (2-7), we reassessed its virtual endocast in light of our findings. We also assessed the virtual endocasts of a microcephalic woman whose endocast is alleged to resemble that of LB1 (4) and a pathological H. sapiens specimen that, like LB1, represents an 3-foot-tall adult female. [Although this specimen was labeled as a "dwarf," this heterogeneous medical condition (MCPH, MIM #210710; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) should not be confused with endemic dwarfism.]

Results

Virtual endocasts were electronically measured to obtain cranial capacities that are traditionally used to approximate brain mass (Table 1). Brain size of microcephalics departs further below normal values as microcephalics mature because it reaches its maximum earlier than is the case for normal humans and then decreases in size (27). For this reason, we estimate the upper limits of brain size for adult microcephalics from data for that group (Michel Hofman, personal communication) rather than using normal humans as a reference population. The mean brain weight for 25 microcephalics (sexes combined) aged 21-74 years

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The authors declare no conflict of interest.

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Abbreviation: CT, computed tomographic

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NEUROSCIENCE

[PAGE BREAK]

JU
JAY BE
'ILL RIFE AS
NGE ANIMAL
DAMING,
foolish suggestion of all is that the
animal is a malacopoda. Now who
in the world would ever imaglue that
a malacopoda would go bothering
around In this part of the country?
Of all the animals of more or less
wildness that-this one is apt to be
it may be positively stated that the
malucopoda is the least apt, and peo-
ple who have been brought up with
a particular fear of the malacopoda
instilled in their natures since earl
lest childhood are urged to have no
further fear on this score.
And in the same manner
there
A JOL
THEIR A
SOUTH
EV
would appear to be no particular DAY AND
GUND MANSFIELD reason why the koala, the nyula, the
of it, it scems
e of absurdity 10
te that such
ajou could have
an
cacomixie, the rhinolophid and the
pterodactyl should not also be dis-
missed with a mere mention.
..All Sort
ding Ba
Races
the Elk
of Event
Althougl
and it seca
was only.
had a delig
on Friday,
In
from the
Makes, According But with all of these out of the way
nesses, are we the real identity of the wild animal

Blood-Cardling
which has brought on such a reigu
of terror among the people living a
anging Its Base
the vicinity of the northeast part of
the Southeastern the city, rematus as much of a mys-
wnship.
tery as ever and the people who
the
have heard the noises made by
beast refuse to be convinced that
they have simply "been hearing
things" and insist that there is
reality some grounds for their fears.
Thus far, however, the animal-
if there really is an animal-bas been
ty, in fact into sufficiently crafty to avoid all of the
ity, without hav-| many hunters who have been on the
and dispatched lcokout for it and seems to have naking a
kept itself concealed in some of the and 500,
nearby woods during the day, only South par)
venturing out after nightfall in order fashion.
to satisfy its appetite and it would
appear that on these noctural visits
its devotes practically all of
attention to the chicken roosts and
native heath and
way.
people who have
the awe-inspiring
eemed to emanate
some wild beast.
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Jis wife is
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LOOKS LIKE A "T.AGGER."
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There w
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the residents of section infested can attest its fond-
ortheast of the uess for a Doultry diet by a notice- which priz
such a degree of able shortage in their chicken
hey would not be ulation.
a kinkajou of the
would
suddenly
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in this section of
gh to cause any
ar but the dauger
imminent in view
pop-
contests A
well as an
There was an unauthenticated re-tails of w
port floating about Saturday that umns than
sounds not unlike those produced by al, so tha
the animal which is supposed to he winners, n
making its headquarters
northeast lows.
of the city, had been heard by peo-
ple passing along the road southeast
of town and it was thought possible
en A. J. Baugh- that this same mysterious beast had
mber ever having sought a "new pasture, but the 111-
that sort in this formation. at hand is too vague to
aty or in the vi- carry much welgbt.
ble is the asser-
s that the animal
WORKING AT $1.50 A DAY
Guessing
For M
won by A.
for lad
won by C
Base Br
Winning

[PAGE BREAK]

AUTOLO CORE 3532
animal as the kinkajou could have

wandered from its native henth and
reality some grounds for their fears.
over
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the
and the staying away of many be- final one before there is a general
Thus far, however, the animal-
if there really is an animal-bas been cause of the threatening weather, meeting for the preparation
two hundred members of the report that must be made to the gov-
co■e into this county, in fact Into sufficiently crafty to avoid all of the
this immediate vicinity, without hav-| many hunters who have been on the lodge, with their families and ladles
ing been detected and dispatched lookout for it and seems to have naking a company of between 400
kept itself concealed in some of the and 500, enjoyed the afternoon at
nearby woods during the day, only South park after the most approved
1enturing out after nightfall in order fashion.
to satisfy its appetite and it would
appear that on these noctural visits
its deroles practically all of Its
attention to the chicken roosts and
while It was on its way.
Yet many of the people who have
been startled by the awe-inspiring
Boises which have seemed to emanate
from the throat of some wild beast,
which it is claimed, has been causing
LOOKS LIKE A "TAGGER."
cold chills to run up and down the a number of the residents of the
sninal column of the residents of section infested can attest its fond-
All of the committees had done
good work to make the event a suc
cess and it was such in every respect.
The afternoon was spent in various
pastimes and sports, and about 6 p.
m. supper was laid on Jong tables
in the grove. And it was a good sup
per, too. Every Elk will testify that
Jis wife is an expert in providing
good things to eat, and when the cou-
certed efforts of all these ladies are
spread on the festal board one can
imagine the result.
Old Elhs and young Elks were
there. The men of families, the bach-
elor and their best girls, the tempo-
rarily "bachelor hall contingent, the
boys and girls, big and little, all like
one happy family, were there and cau
testify that the event was an enjoy-
uble one.
eruor. The members have discovered
u wide diversity of view as to what
the laws should be with a view to

listing all of the property and at the same time secure a fair and equitable rate. Under the wording of the resolution providing. for the appointment of the commission, the report is to go to the governor, and the bill to follow will be built along the line of the recommendations of the body. The anti-saloon league has begun its campaign for the enactment of the Rose county local option bill, that now sleeps wtih the senate committee on t■■. In spite of the fact that at the recent nieeting of the members of the assembly at Cedar Point, where the feeling appeared to be against the enactment of such a law at this time, it is understood that the league is working through its many powerful agencies to Secure votes for the bill. Jn sonic cases members who are serving their first terms in the senate and house have threatened with the vengeance There was a long bill of sports for been

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Fig. 1.
417,f
1053,m 1124,f
1132,f
1138,f
1142,f
1260,m
1263,m
1270,m
1381,f 1445,F
276,m
315,?
358,f
422,m
504,f
505,f
554,f
667,m
671,m
752,f
[AD] $572,m
Comparisons of right lateral views of virtual endocasts from 10 normal humans (Upper, blue) and 9 microcephalics (Lower, blue). Discriminant and canonical analyses classify the virtual endocast of LB1 [417,f (Upper, red)]

with normal humans and those from a female human dwarf (752,f, Lower) and the Basuto woman (358,f, Lower) with microcephalics. Images are labeled with their cranial capacities and sex: f, female; m, male (see Table 1 for details about individual specimens)

is 365 g with a SD of 95 (±3 SD, 80-650 g), which gives an upper limit of 650 g(cm^3) (see SI Text). Because this upper limit is considerably higher than the 400-500 g widely quoted as typical for primary microcephalics (9-15), we believe the estimated range is likely to incorporate most, if not all, members of that group. Although two of the microcephalics in our sample have capacities that were slightly above the upper limit, we included them in our initial analyses to increase our sample size (Table 1). One of them (UV 3795, 667 cm^3) was porencephalic (a condition characterized by fluid-filled cavities in the brain) and therefore a secondary microcephalic. The mean capacity for our nine microcephalics is 498 cm^3, and the mean for the seven that have cranial capacities below 650 cm^3 is 450 cm^3. These data suggest the clinically testable hypothesis that adults that are diagnosed as microcephalics and have brain volumes exceeding 650 cm^3 are secondary microcephalics.

Eight measurements were obtained electronically from the virtual endocasts and used to generate four ratios that we thought would discriminate between the two groups {Fig. 2: 2/1 (cerebellar protrusion), [2-4]/1 (relative length posterior base), 6/5 (relative cerebellar width), and 8/6 (relative frontal breadth); see Materials and Methods}. Using the four variables, discriminant and canonical analyses were used to study shape differences between microcephalic humans (n 9) and normal humans (n 10), and backward stepwise discriminant analysis was used to select the most powerful discriminators (SI Table 3). All four variables, when analyzed individually, resulted in statistically significant discriminant functions ($P < 0.001$; SI Table 4 and SI Fig. 5). With the resulting classification functions, cerebellar protrusion misclassified one microcephalic as a normal human (SI Table 3). Relative length posterior base misclassified a normal human as a microcephalic. Relative cerebellar width misclassified three microcephalics as normal humans, and relative frontal breadth misclassified two microcephalics as normal humans. The backward stepwise discriminant analysis retained

two variables (cerebellar protrusion and relative frontal breadth %; SI Tables 3 and 4). Both ratios and the resulting discriminant function (root) were highly significant ($P < 0.002$),

with the most heavily weighted ratio being cerebellar protrusion. Fig. 3 is a scatter plot of these two variables, which classified microcephalics (M) and normal humans (NH) with 100% success. LB1, the human dwarf, and the Basuto woman (which were not used to develop the discriminant and classification functions) were then classified. LB1 sorted with normal humans (>99% probability) and the other two classified as microcephalics (human dwarf >99% probability and Basuto woman 99% probability; Fig. 3).

When we began our study, we did not know the size or shape of the dwarf's virtual endocast but suspected that the 3-foot-tall specimen might be a microcephalic. The cranial capacity of 752 cm^3 that we obtained for the human dwarf is 100 cm^3 above the upper limit we estimate for primary microcephalics. Because the dwarf's brain size is considerably smaller than the mean of 1,300 cm^3 for normal women (27) and because our analysis classified the dwarf's brain shape as being that of a microcephalic, we believe it represents a variant of microcephalic primordial dwarfism (MCPH, MIM #210710; Online Mendelian Inheritance in Man, www.ncbi.nlm.nih.gov/omim) and is therefore a secondary microcephalic. LB1's 417-cm^3 endocast, on the other hand, classified with normal humans, indicating that its brain shape differs completely from that of this 3-foot-tall-adult secondary microcephalic female H. sapiens.

Because LB1's capacity is only 417 cm^3 (1), we were particularly interested in learning what shape features may discriminate the smaller-brained microcephalics from normal humans. A second analysis was performed after deleting the two microcephalic brains with volumes >650 cm^3 from the data set. The most powerful discriminators from our first analysis (individually and in combination) were, again, used to derive new classification functions, which were used to classify cases. As in the first analysis, cerebellar protrusion misclassified one microcephalic as a normal human. Relative frontal breadth misclassified no case, however, compared with the first analysis in which it misclassified the two largest microcephalics as normal humans. The combination of these two discriminators misclassified no case (with posterior probabilities for group membership exceeding 0.9999 for all cases) and, again, LB1 was classified with normal humans and the dwarf with the microcephalics. When the two big microcephalics were not used to create the classification function, the Basuto woman classified with microcephalics with 100% probability. These data suggest the testable hypothesis that smaller-brained primary microcephalics may have smaller relative frontal breadths than bigger-brained (possibly secondary) microcephalics, and raises the possibility that future research on virtual endocasts and clinical imaging studies could reveal phenotypic characterizations that might have diagnostic significance for known microcephaly loci (SI Table 2) (26).

Discussion

Because the sample of microcephalics we used to develop the classification functions contains only nine individuals, one might argue that it is too small to be representative. As is the case for fossil hominins, microcephalic skulls are rare and our sample has the advantage of being extremely heterogeneous and therefore more likely to capture general features that may characterize microcephaly. Our specimens represent both sexes, ages ranging from 10 years old to adult, cranial capacities from 276 to 671 cm^3, and come from different parts of the world including Europe, the United States, South America, and Africa (Table 1). It contains both primary and secondary microcephalics, although we believe most, if not all, of the individuals below 650 cm^3 are probably

primary microcephalics, which is the form of microcephaly most
often attributed to LB1. LB1 resembles normal humans in the
Falk et al.

[PAGE BREAK]

KINKAJOU
IT MAY BE
SPECULATION
STILI, FE
TO WILAT STILANGE ANIMAL
DAY HE ROAMING,
As
foolish suggestion of all is that the
Baleal ta a malacopoda. Now who
In the world would ever imagine that
a malacopoda would ED bothering
around In this part of the country?
01 all the animals of raore or less
wildness that this one is apt to bo
It may be positively stated that the
A JOLLY TIME
THE
AMONG ELK
malacopods is the least apt, and pe- THEM ANNUAL OUTING
ple who have been brought up with
particular fear of the malasopoda
Instilled in their natures since nar
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while it was on lin way
Tet many of the people who have early woods during the day, only South park after the most appr
enturing out after nightfall in orde. tasilca.
Len startled t the awe-tririns to sadsfy its appetite and it would
Dotses which have reeued to emanste area that on theen noctural viafts
from the throat of some wild Senil. lis detotes practically all of ita
which it is claimed ban teen causing attention to the chicken roosin and
LOOKS LIKE A TAGGEIL"
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All of the committees had
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The afternoon was sent la raj
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m. supper was lal on long u
In the gro And it was a good
per, luu Every Ek will testify
lila wife la an expert in provi
good things to eat, and when the
certed efforts of all these ladies
read on the festal board ca
imagine the result.
Old Eike and young Elks
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rarily "bachelor hall" contingent
Toys and girls, big and little, all
une happy family were there no
Letify that the event was an e
auk one
There was a long till of sport
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pop-contests aroused much exciteme:
well as antenient, the completi
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spinal column of the residents of fan lefested can attest la fond-

the vialaity just northeast of the mess for a poultry diet by a notice
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the country is eccugh to cause any
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of the fact that eren A. J Bangb that this same mysterious beast bad
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EVENT NO. 1
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elaity of Bellville.
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tion of some others that the animal
In question is nothing more or less)
WORKING AT $1.50 A DAY
than a toplomys, and it is hard to As Jarurs While Paying red Lands
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tions of this kind or even give cred-)
ence to a story that there la any kind
of an unusual saimal running around
so near to a thickly populated com
alty as this in
Rut even at that, it is n Titile bard
6 a llay.
The case of Rulley Asbaugh v. the
beard et Richland county mmsalon
ers et al, the proceeling to ass
damages for the destruction of the
mere or less fammons Campbell mill
dam, southeast of the city, har bega
to doubt the reliability of so many tried a secuud uime and it is to be
Teracious citizens as claim to bave hoped that no error will be frund tr

the proceedings this time, as It reeins
EVENT NO 2.
Dase Bell Gar
Waning team prize. box
gars. won by Jay Dirlam's nice.
Luting team. prire, nine dne
uns, won by H. W. Hartean's nir
Fenre 18 to 11. 6 innings
EVENT NO. 1. -
liunaing races-
Men under forty, 100 yds, 1
air cuspenders, won by Jay Di
Men over furty. 150 rds: ;
stein. won by Jacobs Itinehart.
(Jake says he's culy 27).
For ladies. 50 yds, prize. allver
receiver wop y Martha Gibeon.
EVENT NO. 4.
Elepping cutest (blindfolded)
For men, 60 pares, prize, anc
set. won by L. Fruendlich.
For ladies, 40 paces, prize na
la. won by Mrs. Jacob Rinehart
EVENT NO. 5.
Stake race-
For men, price, necktie won L
L Slovens
For ladies, prize. silver top po
tox, won by Mr. H. N. Redding.
to cost the cDLY more money in the
way of damages when a new trial is
bad to say nothing of the increased
roste which are saddled ea Another
thing about the mattPT t that the
prosecuting attorney cannot get any
extra fees these days for helping to
in which the county is later
ested. The allarneys for the land.
owner certainly hat things comine
their way at this recood trial in the
first place the threatened to have a
range of venne and have the casu J
Iried elsewhere. The result was that
the jury was entirely composed of
farmers, or men who are residents
skie of the citr One man who hail
been a farmer, but who in new living
at Bellville, was on the jury, but all
The rest where almon pare farmer
This certainly made it a lopsided fury
In tavaf of the landowner on the fan:
of the proceedings. The Jury gri the
case along alt 3 o'clock la the af

ternoon. As they all wanted to get
home that night, it war arranged to
pay them off then and there before
Leard the roaring. marling, whining the retired to delibertair for the reas
beast gallivanting around while they on that when they get through with
were on their way bome. or roster the case the Intaster's office would
them from their slumbers by oremilkely bave bora cla and they
las to come foto their very dour-weld not have been able in gel bel
yard.
When the Jurymen put their
IT MAY COME TO ITS
money
But what would seem like the most ey there was a bowl of large and
PASTY FOOD
The Commrobly red.
EVENT NO. 5.
Lean men a race(fal men d
Lave enough to 130)
Prin travelling Eask, won 1
W Fanst.
EVENT NO. 1,
Ball throwing coolest-
Mea's prize, tobacco jar, wo
C. B. Umbrell
Ladler prize card car, wo
its Martha Maxwell
After the pleasurable after
and the supper at the park, the a
cakers adjourned to the city as
the Elk home where the
was devoted to terpelchorean
proportie 11 neems that the en pres cards and olber diversions.
provides in this class of condemnatlen! And prizes were awarded here
cases that the Jurym shall recelThere were dancing contests
[AD] $1 per day, bormay the regular way many couples put the best
Jarman gets $2 per day. The forward. kept the judges busy t
kicked long and hard an account of
Waitz-
To realleman, price, pocket I
Harland M. Wirth.
The use of parts cereals is not ad- the size of their checks. They stated cide apea the winners, but a
virable. A physician says: Tasly that la the first place this is a very were finally made as follows:
ereals are very totisestile and a busy Ume of year for them. Some of
bad thing for the stomach, rast them had harvest hands working
depressed feeling and quite a train of them at the rate of 2 per day, while
alsorders particularly of the laic they, the owners of the farms, were on
times and serTex
the Jury at Mansfeld for four days al
"Cerrals, such as wheal and ale rate of $1.74 pray.
can be cooked gough and well the jury men kicked pretty hard shout
enouch to fit thera fer hunen ase, but the slan of their stipends they get no
The ordinary war of cooking leaves (more and were finally chaset tato a
them in a pasty conditio

Although
To lady, Miss Mary Small,
Two blep-
To lady, prize, tooth break b
Mr. J. J. McIntyre.
To gentleman, prise, pair wir
m where they deliberated two ders. B. Curke Drown.
A falass man s "My heare before returning a rerdict Is To couple appearing to best a
dan punhibited the ura of oats and was the first (lane a Jury has been nalu tace in the two step-
Mansfield, ohio
Mansfield News
8-17-1907

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KINKAJOU
IT MAY BE
SPECULATION
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Table 1. Specimens used
Cranial
Specimen
Age, years
Sex
capacity, cm^3
Repository
ID
Diagnosis
14
M
667
UV
3795*
Secondary
20-30
M
572
microcephaly
UV
5385
Microcephaly

315
WU
10
M
276
AMNH2792a
Microcephaly
Primary
56988
Sub-adult
F
554
PMHU
7200*
Microcephaly
Adult
M
422
PMHU
Nearly adult F
504
NMNH
Adult
F
505
UM
7387*
379510*
96-11-128A
Microcephaly
Microcephaly
microcephaly
Comments
Associated with porencephalic, genu valgum, pes calcaneus, scoliosis
Skull cast from early 20th century, detailed impressions endocranially
Skull cast; individual lived in Germany, late 19th century
From Peru
From Mauritius, African features,
From Peru (Chilca)
Microcephaly
Adult
M
671
UM
660
Microcephaly
32
F
358
FMNH

Microcephaly
30
F
417
INCA
LB1
Basuto woman, South Africa
H. floresiensis
-234567890
25
F
1,138
WU
66-10
Normal human
20-30
M
1,270
FSU
20-30
Normal human
Caucasian
40
F
1,132
WU
78-8
Normal human
40
M
1,053
WU
67-11
Normal human
20-30
M
1,263
FSU
C20-C30
Normal human
18-25
M
1,260
FSU
C18-C25
Normal human
Caucasian
Caucasian
45+
F
1,381
FSU
OBF

Normal human
Black
45 +
F
1,445
FSU
OFU
Normal human
18-25
F
1,124
FSU
PAAF
10
45 +
F
1,142
FSU
20
F
752
UPM
001
1190*
Normal human
Normal human
Dwarf
Probably African-American
Probably African-American
3 ft tall; Tubingen, Germany
*CT data provided directly, other specimens scanned at Barnes Jewish Hospital, St. Louis. AMNH, Amercian Museum of Natural History; FMNH, Field Museum of Natural History; FSU, Florida State University Department of Anthropology; INCA, Indonesian National Centre for Archaeology, Jakarta, NMNH, National Museum of Natural History (Smithsonian); PMHU, Peabody Museum of Archaeology and Ethnology, Harvard University; UM, University of Michigan Department of Anthropology; UPM, University of Pennsylvania Museum of Archaeology and Anthropology; UV, Museum of Pathology and Anatomy, University of Vienna; WU, Washington University School of Medicine. Data for microcephalics (M) and normal humans (NH) from authors and G. Conroy, Washington University School of Medicine (M# 3); K. Mowbray, American Museum of Natural History (M #4); D. Lieberman, Harvard University, M. Morgan and J. Brown, Peabody Museum (M # 5-6), Bruno Frohlich and D. Ubelaker, National Museum of Natural History (Smithsonian Institution) (M #7); Milford Wolpoff, University of Michigan (M #8-9); G. Doran and Colette Berbesque, Florida State University (NH #2, 5-10); and Janet Monge, University of Pennsylvania Museum (dwarf). R. Martin provided the endocast of the Basuto woman, upon which we performed a computed tomographic scan.

shape of its orbital surface (Fig. 1 and SI Fig. 6); the endocast of the Basuto (Lesotho) woman that is supposed to resemble LB1 (4, 31) does not (Fig. 1). We are pleased to have obtained a copy of this microcephalic endocast that was described by Martin et al. (4, 31) but were unsuccessful at our repeated efforts to obtain information about the repository and specimen number of the

key microcephalic endocast that was alleged to be nearly identical to LB1's by Weber et al. (2) or, more importantly, to obtain

Fig. 2. Key for right lateral (a), posterior (b), and inferior (c) views of endocasts. Measurements (3, a chord; others projected) (a) 1, cerebral length (fp-op), 2, cerebellar pole-projected frontal pole; 3, anterior cerebral height (chord v-tp); 4, temporal pole-projected frontal pole, (b) 5, cerebral width (right and left points that define maximum projected width); 6, cerebellar width (right and left most lateral points on cerebellum, includes sigmoid sinus if visible in posterior view); 7, endocast height (v-b); (c) 8, frontal breadth (mat-mat). Landmarks: b, midpoint on line tangent to the base of cerebellum; bs, intersection of right brainstem with right temporal lobe, cp, most caudal point on the cerebellum in lateral view (may be on either side); fp, most rostral point on the frontal lobes in lateral view (may be on either side); mat, in basal view, point at lateral edge of endocast located at level of the most anterior point of the temporal lobe; op, most caudal point on occipital lobes in lateral view (may be on either side); tp, most rostral point on temporal lobes in lateral view (may be on either side), v, vertex. Four indices used in discriminant and canonical analyses. cerebellar protrusion 2/1; relative length posterior base (2-4)/1, relative cerebellar width 6/5; relative frontal breadth 8/6.

[PAGE BREAK]

alman!u |
LOOKS LIKE A "TAGGER."
cold chills to run up and down the a number of
spinal column of the residents
of
section infeste
the
of
the vicinity just northeast of
city, have reached such a degree
nervousness that they would not be
greatly surprised if a kinkajou of the
very fiercest kind would suddenly
spring upon them.
The mere idea of there being an
animal of this kind in this section of
the country is enough to cause any

one to gasp with fear but the danger
Is not particularly imminent in view
of the fact that even A. J. Baugh-
man falls to remember ever having
seen an animal of that sort in this
section of the county or in the vi-
cinity of Bellville.
Equally improbable is the asser-i
tion of some others that the animal
in question is nothing more or less
than a loplomys, and it is hard to
see why people should make asser-
tions of this kind or even give cred-
ence to a story that there is any kind
of an unusual animal running around
so near to a thickly populated com-
munity as this is.
uess for a po
abie shortage
ulation.
There was
port floating
sounds not un
the animal w
making its h
of the city, ha
ple passing al
of town and i
that this same
sought a new
formation, at
carry much w
n
WORKING
As Jurors W
The case of
board of Rich!
ers et al, the
damages for th
more or less
dam, sontheas!
tried a seconc
have hoped that no
But even at that, it is a little hard
to doubt the reliability of so many
veracious citizens as claim to
IT MAY COME TO THIS.
heard the roaring. snarling, whining
beast gallivanting around while they
the proceeding
to cost the cu
way of damag
had. to say not

costs which ar
thing about th
prosecuting att
extra fees the
ty cases in w
ested. The att
Owner certainl
their war at tl
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tried elsewher
the jury was
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side of the cit:
been a farmer
at Bellville. w
the rest where
This certainly
in favor of the
of the proceed
case along ais
terncon. As u
home that nig
pay them off t
they retired to
on that when
were on their way home. or rousing the case the ti
them from their slumbers by
ing to come into their very
Jard.
seem-ilkely have h
door-would not hav
money. When
But what would seem like the most money there w
ABAV
proportions.
provides in thi

[PAGE BREAK]

JU
JAY BE
'ILL RIFE AS
NGE ANIMAL
DAMING,
foolish suggestion of all is that the
animal is a malacopoda. Now who
in the world would ever imaglue that
a malacopoda would go bothering
around In this part of the country?
Of all the animals of more or less
wildness that-this one is apt to be
it may be positively stated that the

malucopoda is the least apt, and peo-
ple who have been brought up with
a particular fear of the malacopoda
instilled in their natures since earl
lest childhood are urged to have no
further fear on this score.
And in the same manner
there
A JOL
THEIR A
SOUTH
EV
would appear to be no particular DAY AND
GUND MANSFIELD reason why the koala, the nyula, the
of it, it scems
e of absurdity 10
te that such
ajou could have
an
cacomixie, the rhinolophid and the
pterodactyl should not also be dis-
missed with a mere mention.
..All Sort
ding Ba
Races
the Elk
of Event
Althougl
and it seca
was only.
had a delig
on Friday,
In
from the
Makes, According But with all of these out of the way
nesses, are we the real identity of the wild animal
Blood-Cardling
which has brought on such a reigu
of terror among the people living a
anging Its Base
the vicinity of the northeast part of
the Southeastern the city, rematus as much of a mys-
wnship.
tery as ever and the people who
the
have heard the noises made by
beast refuse to be convinced that
they have simply "been hearing
things" and insist that there is
reality some grounds for their fears.
Thus far, however, the animal-
if there really is an animal-bas been
ty, in fact into sufficiently crafty to avoid all of the

ity, without hav-| many hunters who have been on the
and dispatched lcokout for it and seems to have naking a
kept itself concealed in some of the and 500,
nearby woods during the day, only South par)
venturing out after nightfall in order fashion.
to satisfy its appetite and it would
appear that on these noctural visits
its devotes practically all of
attention to the chicken roosts and
native heath and
way.
people who have
the awe-inspiring
eemed to emanate
some wild beast.
bas heen causing
its
and the s
cause of t
over two
lodge, witi
All of t
good work
cess and it
The ufte
pastimes a
m. supper
in the ro
per, too.
Jis wife is
good thing
certed eftc
spread on
imagine t
Old Ell
there. The
elor and t
rarily "bac
loys and
une happy
LOOKS LIKE A "T.AGGER."
the
testify tha
uble one.
There w
up and down the a number of the residents of
the residents of section infested can attest its fond-
ortheast of the uess for a Doultry diet by a notice- which priz
such a degree of able shortage in their chicken
hey would not be ulation.
a kinkajou of the
would
suddenly

f there being an
in this section of
gh to cause any
ar but the dauger
imminent in view
pop-
contests A
well as an
There was an unauthenticated re-tails of w
port floating about Saturday that umns than
sounds not unlike those produced by al, so tha
the animal which is supposed to he winners, n
making its headquarters
northeast lows.
of the city, had been heard by peo-
ple passing along the road southeast
of town and it was thought possible
en A. J. Baugh- that this same mysterious beast had
mber ever having sought a "new pasture, but the 111-
that sort in this formation. at hand is too vague to
aty or in the vi- carry much welgbt.
ble is the asser-
s that the animal
WORKING AT $1.50 A DAY
Guessing
For M
won by A.
for lad
won by C
Base Br
Winning

[PAGE BREAK]

PNAS PNA
Fig. 3.
Relative frontal breadth
1.1
-N-N
1.05-
LB1
0.95 N
=N =<N
0.9-
085-
0.8-
N=
M
"M
■Dwarf
-M
-BW
M

Scatter plot of relative frontal breadth on cerebellar protrusion. The legend of Fig. 2 contains a description of the measurements that were used to create the ratios. Discriminant analysis demonstrated that these two variables classified microcephalics (M) and normal humans (N) with 100% success The dwarf, Basuto woman (BW), and LB1, which were not used to develop the classification functions, were classified, respectively, as two microcephalics and a normal human.

a copy or computed tomographic (CT) scan of the endocast so that we might include it in the present analysis.

Our analysis of the virtual endocast of 10-year-old microcephalic Jakob Moegele has been criticized because we performed a computed tomographic scan of a cast whose parts (the calotte and base) were different colors and chemical compositions (4, 31). Despite the skull's calotte and base having been cast separately, the CT data produced a seamless virtual endocast (Fig. 1 and SI Fig. 6) with a volume of 276 cm^3, which is very close to the 272 cm^3 initially reported (32). Indeed, figure 3 of Martin et al. (31) reveals the similarity in the shape of the original skull and the cast that we scanned, and shape rather than color of the cast parts is the salient feature in our analyses. Because primary microcephalics are believed to achieve their maximum cranial capacities by around four years of age (27), there is no reason to exclude a 10-year-old microcephalic from our analysis. As noted, the added variation in age and cranial capacity increases the diversity of our sample, which makes it more likely that it captures general traits of microcephalics. The most compelling reason for including Jakob Moegele's virtual endocast in our sample, however, is because our analyses show that it classifies with the other microcephalics in all respects.

Despite the heterogeneity of our microcephalic sample, certain shape features distinguish it from that of normal humans: Microcephalics usually have cerebella that protrude more caudally (Fig. 1 and SI Fig. 4) and appear disproportionately larger than those of normal humans (Fig. 1) (27). The relatively smaller frontal breadths of microcephalics (Fig. 3) are consistent with their typically sloping foreheads, frontal lobes that are more pointed rostrally in dorsal views, and hypothetically smaller forebrains (15, 21, 26, 27, 29). In brains of normal humans, the orbital surface of the frontal lobes (in lateral view) is expanded due to ventral protrusion of the cortex medially (underneath the paths of the olfactory tracts) (33) (Fig. 1 and SI Fig. 4). Virtual endocasts of microcephalics, on the other hand, appear flatter on their orbital surfaces, which is consistent with images of actual

brains (21, 29), even when the sulci and gyri appear superficially normal (SI Fig. 4). The indices that describe cerebellar protrusion and relative frontal breadth, which together perfectly sort our sample of microcephalics from normal humans, represent traits that are visually apparent and in keeping with descriptions of microcephalics in the clinical literature. Because our classification functions sort together microcephalic endocasts that

range in size from 276-671 cm^3, our shape analyses are not constrained by allometric scaling. (The question of whether microcephalic brains scale allometrically in other ways is beyond the scope of this paper but could be addressed in future studies using 3D geometric morphometrics.)

Two genes that cause microcephaly when mutated (SI Table 2) are hypothesized to have been under pronounced natural selection in the last common ancestor of apes (microcephalin, MCPH1) and in hominins (ASPM, MCPH5) in conjunction with increasing brain size (11, 12, 15) although their precise correlation with phylogenetic increases in this trait has been questioned (25). Our findings are consistent with the hypothesis that genes associated with primary microcephaly may have had a role in primate brain evolution and, more specifically, that some brain dimensions in primary microcephalics resemble those of early hominins (12). Endocasts of an early hominin genus, Paranthropus, that is not believed to have been directly ancestral to humans retained an apelike shape of the orbital rostrum (in lateral views) and pointed frontal lobes (in dorsal views) (33) similar to endocasts of primary microcephalics (Fig. 1 and SI Fig. 4). Between 2.5 and 3.0 million years ago, a derived ventrally expanded orbital surface and squared-off frontal lobes (in dorsal view) appeared in another species that may have been directly ancestral to humans, Australopithecus africanus (33). These converging data raise the interesting possibility that genes involved in primary microcephaly (e.g., ASPM) may have been important for the evolution of the shape and internal organization of the orbitofrontal cortex in addition to their effects on brain size.

A study that concluded LB1 is a microcephalic pygmy H. sapiens rather than a new species of hominin (7) provided no measurements of the neurocranium. This study is refuted not only by our findings but also by an investigation of LB1's affinities using cranial and postcranial metric and non-metric analyses that included comparisons with pygmies from Africa and Andaman Islanders as well as a "pygmoid" excavated from another cave on Flores (34). As shown here, the frontal breadth relative to cerebellar width and lack of cerebellar protrusion of LB1's endocast classify it with 100% probability with normal H. sapiens rather than microcephalics. The relative length of its orbital surface also sorts LB1 with H. sapiens (1). On the other hand, LB1's endocast shows affinities with Homo erectus in its relative height, disparity between its maximum and frontal breadths, relative widths of its caudal and ventral surfaces and long, low lateral profile (1). Its tiny cranial capacity, relative brain size, and derived ventrally expanded orbital surface, however, show affinities with Australopithecus africanus (33).

Because subsets of LB1's features occur normally in other hominins and because virtual reconstruction adjusted for the slight in situ distortion of LB1's skull, these endocast features should not be attributed to pathology nor to postmortem mechanical deformation. The above findings for LB1, plus its bilaterally expanded but otherwise normal-appearing gyri in the region of Brodmann's area 10 (1), are consistent with its attribution to a separate species, H. floresiensis (35-37). Although LB1's relative brain size seems not to scale on the ontogenetic curve for H. erectus (1), a recent study of brain size in Pongo raises the possibility that H. floresiensis' relative brain size may have been reduced because of ecological factors (38), consistent with the insular-dwarfing hypothesis. Other analyses of cranial and postcranial data, however, suggest that H. floresiensis may be descended from an earlier small-bodied hominin from either Australopithecus or Homo (34).

Materials and Methods

CT scans of 5 microcephalic skulls, 1 microcephalic endocast, and 10 normal human skulls (Table 1) were performed at Washington University School of Medicine. The CT scan parameters (and reconstruction kernel) were chosen to produce optimal reconstructions. Our material was scanned with

Falk et al.

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AUTOLO CORE 3532
animal as the kinkajou could have
wandered from its native henth and
reality some grounds for their fears.
over
of
the
and the staying away of many be- final one before there is a general
Thus far, however, the animal-
if there really is an animal-bas been cause of the threatening weather, meeting for the preparation
two hundred members of the report that must be made to the gov-
co■e into this county, in fact Into sufficiently crafty to avoid all of the
this immediate vicinity, without hav-| many hunters who have been on the lodge, with their families and ladles
ing been detected and dispatched lookout for it and seems to have naking a company of between 400
kept itself concealed in some of the and 500, enjoyed the afternoon at
nearby woods during the day, only South park after the most approved
1enturing out after nightfall in order fashion.
to satisfy its appetite and it would
appear that on these noctural visits
its deroles practically all of Its
attention to the chicken roosts and
while It was on its way.
Yet many of the people who have
been startled by the awe-inspiring
Boises which have seemed to emanate
from the throat of some wild beast,

which it is claimed, has been causing
LOOKS LIKE A "TAGGER."
cold chills to run up and down the a number of the residents of the
sninal column of the residents of section infested can attest its fond-
All of the committees had done
good work to make the event a suc
cess and it was such in every respect.
The afternoon was spent in various
pastimes and sports, and about 6 p.
m. supper was laid on Jong tables
in the grove. And it was a good sup
per, too. Every Elk will testify that
Jis wife is an expert in providing
good things to eat, and when the cou-
certed efforts of all these ladies are
spread on the festal board one can
imagine the result.
Old Elhs and young Elks were
there. The men of families, the bach-
elor and their best girls, the tempo-
rarily "bachelor hall contingent, the
boys and girls, big and little, all like
one happy family, were there and cau
testify that the event was an enjoy-
uble one.
eruor. The members have discovered
u wide diversity of view as to what
the laws should be with a view to
listing all of the property and at the
same time secure a fair and equitable
rate. Under the wording of the reso-
lution providing. for the appointment
of the commission, the report is to
go to the governor, and the bill to
follow will be built along the line of
the recommendations of the body.
The anti-saloon league has begun
its campaign for the enactment of the
Rose county local option bill, that
now sleeps wtih the senate commit-
tee on t■■. In spite of the
fact that at the recent nieeting of the
members of the assembly at Cedar
Point, where the feeling appeared to
be against the enactment of such a
law at this time, it is understood that
the league is working through its
many powerful agencies to Secure
votes for the bill. Jn sonic cases
members who are serving their first
terms in the senate and house have
threatened with the vengeance
There was a long bill of sports for been

[PAGE BREAK]

Celebrates Sixty-Fifth Anniversary
Joliu DeBo, in celebrating his sixty-
fifth birthday anniversary yesterday,
entertained 20 guests, who came from:
Hueneme, Los Angeles, Long Beach
the past month is now improving.
MYSTERIOUS BEAST
and Oxnard to take part in the festiv- REPORTED BY BRITON
Itles and dinner, observing his anni-
versary and Thanksgiving Day.
ALLAHABAD, India, Nov. 27.-A
Entertain Thanksgiving Day
Mr. and Mrs. A. B. Rodaway enter description of a strange creature with
tained Thanksgiving day, and at dina body like a crocodile, but with a
ner, their guests being H. P. Stadt. head the size and shape of an Ameri-
miller of Exeter, Mr. and Mrs. Henry can basketball, which he encountered
Grimm and family and Mr. and Mrs. in a shooting expedition in the Sun-
Charles E. Rodaway and son, Alfred.
derbunds in Bengal, comes from a
British Army officer, who has just ar-
rived here. ¡
The young of many species of birds
migrate south before their parents
and make the journey without any
memory of the route to guide them.
"Accompanied by a shikari and my
sikh orderly, I had been following the
track of a tiger and tigers for some
hours," be says, "and after a crawl
through the thick grass we had finally
A heavy surf along oceanic shores got near the couple which were bus-
causes vibrations in the earth that are lily engaged in devouring a large boar,
registered by seismographs hundreds but by the time I had crawled forward [
of miles inland.
and was able to see into the recess
Suit or Overcoat
at $40.00 to $50.00
to the smaller items which find a ready place in every man's wardrobe.
Neckwear
Beltogram
Handkerchiefs
Silk Shirts
Silk Hosiery
from $1 to $10
Purses
Umbrellas
Slippers
Sweaters
Golf Hose
Belts

Cuff Links
Golf Knickers
Tuxedo Vests
Gloves
Do Your Christmas Shopping Early
Albert C. Diener
FOR SMART MEN'S WEAR
SEEKE
Oxnard Daily Courier
Oxnard, CA
11-27.1925

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WAS PNA
Siemens Sensation 64 (Siemens Medical Systems, Erlangen, Germany) clinical multislice, computed-tomography (MCT) scanner, located in Barnes Jewish Hospital (St. Louis, MO). Specimens were aligned along a cranial-caudal axis with the nose facing upward, to simulate a normal anatomical head orientation. Scanning parameters included a 512 x 512 matrix, 120 kVp, 300 effective mAs, 32 detectors with dual sampling to achieve a 0.6-mm collimation, a 1-sec table increment per gantry rotation, a pitch of 0.8, a reconstruction interval of 0.5 mm, and a H50s reconstruction kernel. With the higher-depth-resolution images that we used, a high-sharpness kernel was unnecessary. Because the features that we identified crossed many planes, our ability to visualize the features was not compromised by the Nyquist frequency (39), which dictates the resolution above which a feature must be sampled to fully reconstruct the feature. All data were archived to compact disk in DICOM format and transferred to a stand-alone workstation for processing. By using commercially available software packages, Mimics 8.11 (Materialise, Ann Arbor, MI) and Analyze 6.1 (Biomedical Imaging Resource, Mayo Clinic, Rochester, MN), the CT image data were visually assessed and inspected for artifacts and damaged areas. CT scans of four additional microcephalic skulls were provided by the Museum of Pathology and Anatomy, University of Vienna (one); Harvard Peabody (two); and the Smithsonian (one) (Table 1). These scans were performed by using our parameters. CT data for a "female dwarf" were also provided by the University of Pennsylvania Museum. CT scans of LB1 were performed by using a Siemens Emotion CT scanner in Jakarta and analyzed at the Mallinckrodt Institute of Radiology (1).
Virtual endocasts of all specimens were made by using Mimics 8.11. This software provides tools to convert grayscale CT image data into a wireframe "virtual" model. First, the skull is segmented (isolated) from surrounding air and labeled by using a combination of global and local thresholding operations together with a region growing operation. The internal braincase was enclosed, using manual segmentation, to close any contour gaps in the skull, such as at the eye sockets. Once the internal

braincase was fully enclosed, as would be done making a traditional latex endocast, the virtual endocast object was defined with a cavity fill operation, and a 3D object was created within the Mimics 3D Object module. This was done by using the high-quality option. By means of the edge extraction tools within the Mimics STL module, a triangulated surface definition was created from the endocast 3D object.

Shape comparisons were performed between the endocasts by using Geomagic Studio 5 software (Raindrop Geomagic, Research Triangle Park, NC).

Each virtual endocast was aligned in dorsal view, and markers were placed on its most rostral frontal pole (fp) and most caudal occipital pole (op). The endocast was then rotated to the right lateral view and a line placed to connect the two markers; the line was rotated to a horizontal position (Fig. 2A). The projected fp-op distance in lateral view was measured to obtain cerebral length (measurement 1). In the right lateral view, markers were placed on the vertex (v) and most caudal cerebellar pole (cp). These placements were checked with dorsal and posterior views. In right lateral view, markers were placed on the more rostrally projecting temporal lobe at the middle of its curvature (tp), and the intersection of the right side of the brainstem with the right temporal lobe (bs). Anterior cerebral height (measurement 3) was measured as the direct distance (chord) from vertex to tp; and shortest projected distances were measured from cp and tp to the vertical line tangent to fp (cerebellar pole-projected frontal pole, measurement 2; temporal pole-projected frontal pole, measurement 4). The endocast was then rotated to occipital view (Fig. 2B), and markers were added at the most projecting points laterally on both hemispheres of the cerebrum and at the most laterally projecting points of the

cerebellum (at the outside edges of the sigmoid sinuses, if visible). These markers were used to measure the projected maximum widths of the cerebrum (cerebral width, measurement 5) and cerebellum (cerebellar width, measurement 6). Endocast height (measurement 7) was measured as the shortest projected distance from vertex to the line tangent to the base of the cerebellum. Frontal breath (measurement 8) was measured at the mean level of the most rostral points on the two temporal poles in basilar view (Fig. 2C).

Three months after the baseline measurements were made by K.S. and D.F., all identifying features were removed from the three-dimensional computed tomographic images of the 9 microcephalics and 10 humans and one observer (K.S.) repeated all measurements (T2). Bland-and-Altman plots were used to assess measurement reliability, along with plots of baseline (T1) and repeat (T2) measurements for the microcephalics and normal humans (40). Variance components analyses were used to determine the percentages of variation attributable to subjects and time (baseline and repeated measurements). Measurements of the Basuto woman (8) were made (by K.S.) at the time that repeat measurements were made. Repeatability (reliability) analyses were performed with JMP Statistical Software Release

5.0.1 (SAS Institute, Cary, NC) and MedCalc Statistics for Biomedical Research Version 8.1.0.0 (MedCalc Software, Mariakerke, Belgium). Measurement repeatability was high, with >99% of measurement variability being attributable to subjects (see SI Figs. 7-14).

Discriminant and canonical analyses were used to study shape differences between virtual endocasts of microcephalic humans (n 9) and normal humans (n 10). For these analyses, we used the four ratios that we thought would discriminate between the two groups (2/1, [2-4]/1, 6/5, and 8/6) (Fig. 2). Data were tested for normality with Shapiro-Wilk W tests, and the homogeneity of the variances and covariances was tested with a Box M test. Backward stepwise discriminant analysis was used to select the most powerful discriminators (SI Table 4). For the stepwise procedure, the F to enter was set at 4; F to leave was set at 3; and the tolerance was set at 0.01. Each discriminator plus the combination of the most powerful discriminators was used to classify each case into the group that it most closely resembled. In addition, LB1, the Basuto woman, and a human dwarf (which were not used to develop the discriminant and classification functions) were classified into the two groups. Posterior classification of cases was based on Mahalanobis distances, with a priori probabilities being proportional to group sample sizes. Data analyses were performed with JMP Statistical Software Release 5.0.1.2 and STATISTICA (data analysis software system, Version 7.1, StatSoft, Tulsa, OK). Scatter plots for the four variables that were analyzed are presented in SI Fig. 5. The data were normally distributed (Shapiro-Wilk W test, $P > 0.05$), and the variances and covariances were homogeneous across groups (Box M test, $P > 0.05$).

We are deeply grateful to G. Conroy (Washington University School of Medicine), D. Chernoff (Saratoga Imaging), A. Fobbs (National Museum of Health and Medicine), B. Frohlich and D. Ubelaker (National Museum of Natural History, Smithsonian Institution), G. Doran and C. Berbesque (Florida State University), M. N. Haidle (Institute for Prehistory and Early History and Archaeology of the Middle Ages, Tuebingen), M. Hofman (Netherlands Institute for Brain Research), D. Lieberman (Harvard University), R. Martin (Field Museum of Natural History), J. Monge (University of Pennsylvania Museum), M. Morgan and J. Brown (Peabody Museum), K. Mowbray (American Museum of Natural History), L. Sobin (Armed Forces Institute of Pathology), F. Spoor (University College London),

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Minstrel Show
A real old-fashioned minstrel show,
with lots of fun, new jokes and new

music will be given by the Young!
Men's club of Camarillo, at the Pleas
unt Valley schoolhouse tomorrow
night. The public is invited.
Six O'clock Dinner
Mr. and Mrs. Allan Burleson had as
and Mrs, guests to share their Thanksgiving
ue, host turkey and the dellencies that went
with the bird, Mrs. Ella Fitzpatrick
turkey
gs. The and her daughter, Miss Olga.
uge cen-
ecorated
9.
Dine at Lebec Lodge
to
Mr. and Mrs. James Cerny, Miss
ms were rene Nesom, yesterday motored
quets of Lebec where they were joined by Mr.
aud Mrs. Edward Cerny of Visalia,
and the party dined at Lebec lodge,
at the foot of the Ridge route.
sts were
and six
5. Einil
ind Leo;
Attend Football Game
Mr. and
News Notes of People
In and About Saticoy
SATICOY, Nov. 27. Mrs. Myron
Gill attended the W. B. A. carnival
on Thursday evenlog.
where the kill lay, both tiger and ti,football, though rather fatter, with a
Shears for cutting cloth were in
coinparatively slender neck about two rented in Italy about 400 B. C., balit
gress had disappeared.
was two or three centuries later Le
"I was loath to give up the hope of feet long.
"It made straight for the dead' plg fore scissors were made by Atting
still getting a shot, and I therefore
took up my position in some thick and started eating it. Shortly after them to the fingers.
bushes from which while concealed, I another appeared and soon thero were
could view the kill about ten yards at least a dozen around the carcass.
away, thinking that the pair night re- They varied in length from 12 to flye
turn to finish the repast.
or six feet, and all had tho
I had been there for about an hour shaped heads, which, they constantly
arulsed on their long neeks as they
when out of the water-courge
strange looking unitnal appeared. The quarrelled with each other over their
creature was about 10 feet long, and meal."
had a body very like a crocodile, but The strange creatures described by

Joe Milich has moved into the new instead of the ordinary crocodile head the army officer are said to be un,
it had one about the size of a Rugby known to naturalists.
home he recently purchased.
Jas. Flenning, of Oklahoma, father
o! Mrs. Bert Coy, who has been vis-
ing in Saticoy for the past week, has
returned to Los Angeles and Alham-
bra where he will visit with other
children for awhile.
Will Dickenson spent Saturday eve-
nlug In Santa Paula.
Mrs. A. Rye of Ventura dalled on
Mrs. Charles Lauber
Thursday
morning.
on
James A. Serey spent Sunday with
his friend, Chester Adams of Ojal.
Mrs. Harry Hubbell and two sons
Roy Gill, Alfred Gill, Louis Braham, are, spending the week in Los Ange-
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Russian fishermen catch squeaking alien and eat it - Pravda. Ru
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new study says
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spacewalk in 9 days
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Mars orbiter
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skeletons buried in romantic embrace
Explorers find over 100 fossilized
dinosaur eggs in India
Suni Williams sets new record for

longest spacewalk over 22 hours
Debate rages in Kenya as evangelicals
try to keep ancient skeleton in the closet
Sea bird involved in US logging battles
declining in Alaska
Rare mollusk and crustacean species
discovered in Philippines
Love Story actor Ryan O'Neal accused
of assaulting adult son in Malibu
ONEWS OF THE WEEK
Deadliest fire in Russia, in over 3 years
kills 45 women
Robert Gates pessimistic about Iraq
saying US not winning war
The USA executes its citizens every 10
days
■ Article
Russian fishermen catch squeaking alien and eat it
Front page/Science / Mysteries
07.02.2007 D Source:
Village residents from the Rostov region of Russia caught a weird creature two weeks ago after a strong storm in the Sea of Azov. The shark-looking creature was producing strange squeaky sounds. The fishermen originally believed that they had caught an alien and decided to film the monster with the help of a cell phone camera. The footage clearly shows the creatures' head, body and long tail. The bizarre catch was weighing almost 100 kilograms, the Komsomolskaya Pravda reports.
However, ufologists and scientists were greatly disappointed when they found out that the fishermen had eaten the monster. They said that they were not scared of the creature so they decided to use it as food. One of the men said that it was the most delicious dish he had ever eaten
Click here to see the video of the alien sea monster
Chairman of the Anomalous Phenomena Service, Andrei Gorodovoí, stated that the creature, which he could see on the short video, was an anomalous being However, it could hardly be described as an extraterrestrial form of life, he added. Gorodovoi rejected the version about mermaids too
"There are many legends about mermaids living in the Sea of Azov. Nevertheless, specialists of the Service for Anomalous Phenomena have never confirmed those

fairytales. On the other hand, we do not deny the possibility of other forms of life in the Sea of Azov," the ufologist sad.

Russian fishermen catch alien monster

■ BREAKING NEWS

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A spokesman for the Rostov-based zoo, Alexander Lipkovich, contacted local ichthyologists and asked their opinion about the Azov alien. "They said that the fish bears resemblance to a sturgeon. It was an extremely interesting individual. I have never seen anything like this before in my whole life," the specialist said.

Translated by Dmitry Sudakov

Pravda.ru

Mummified man found in his apartment sitting down for 6 years

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Spot the match - wildlife photo-identification using information theory
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Abstract
Background: Effective approaches for the management and conservation of wildlife populations require a sound knowledge of population demographics, and this is often only possible through mark-recapture studies. We applied an automated spot-recognition program (1³S) for matching natural markings of wildlife that is based on a novel information-theoretic approach to incorporate matching uncertainty. Using a photo-identification database of whale sharks (Rhincodon typus) as an example case, the information criterion (IC) algorithm we developed resulted in a parsimonious ranking of potential matches of individuals in an image library. Automated matches were compared to manual-matching results to test the performance of the software and algorithm.
Results: Validation of matched and non-matched images provided a threshold IC weight (approximately 0.2) below which match certainty was not assured. Most images tested were assigned correctly; however, scores for the by-eye comparison were lower than expected, possibly due to the low sample size. The effect of increasing horizontal angle of sharks in images reduced matching likelihood considerably. There was a negative linear relationship between the number of matching spot pairs and matching score, but this relationship disappeared when using the IC algorithm.
Conclusion: The software and use of easily applied information-theoretic scores of match parsimony provide a reliable and freely available method for individual identification of wildlife, with wide applications and the potential to improve mark-recapture studies without resorting to invasive marking techniques.
Background
Effective approaches for the management and conservation of wildlife populations require a sound knowledge of population demographics [1]. For many species, such information is provided by studies that recognize individual animals so that their fate can be followed through time, thus allowing for the estimation of demographic rates like survival [2]. Individual recognition may be achieved either by applying an artificial mark to an animal or by using an animal's natural markings [3]. The former technique is pervasive in ecological studies addressing questions from the purely theoretical [e.g., [4]] to the highly applied [5], and it has been used on both marine and terrestrial species of vastly different sizes [e.g., [6,7]].

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Applying artificial marks to wildlife can, however, alter natural behaviour and reduce individual performance [e.g., [8]]. The marking process itself may be disruptive [9] due to the necessity of handling and restraining for mark application [10]. The loss of marks over time [11] and the non-reporting of retrieved marks [12] can also compromise the estimation of demographic parameters. Additionally, there are often a host of ethical and welfare issues porary marks [13,14].
that can arise from the application of permanent or tem-
To address some of these problems, the identification of individual animals from their natural markings has become a major tool for the study of some animal populations [15], and has been applied to an equally wide range of animals from badgers [16] to whales [17,18]. One of the more popular techniques of recording the natural markings of an animal is photo-identification as this allows storage of photos in a library for subsequent cross-matching and generation of capture-history matrices [17,19]. These libraries can be examined manually to develop a suite of individual matches [19]; however, as the number of photos in a library increases beyond a person's capacity to process the suite of candidate matches manually, the development of faster, automated techniques to compare new photographs to those previously obtained is required [20,21]. Several automated matching algorithms have been trialled with some success [e.g., [20,22-26]], but these are generally highly technical, specialized and target a particular taxon or unique morphological feature of the species in question (e.g., dorsal fin shape and markings in cetaceans). Furthermore, uncertainty in the matching algorithms themselves have never been contextualized within a multi-model inferential framework [27], and so subjective manual matching is

still required to assess reliability [28].

An example taxon that lends itself well to the development and application of a generalist algorithm for photo matching is the world's largest fish the whale shark (Rhincodon typus). This species has been the recent subject of several photo-identification studies [e.g., [19,20,29]], some of which have already provided valuable information on population size, structure [19] and demography [29] under the supported assertion that the spot and stripe patterns of animals are individually unique and temporally stable [19]. The initial assessment of the demography of one population (Ningaloo Reef, Western Australia) [19] has been complicated by the addition of many hundreds of photographs taken during analogous research programmes in other parts of Australia, Belize, USA, Philippines and Mexico [30], and elsewhere (Djibouti, Seychelles and Mozambique). Consequently, the number of photographs available has exceeded the number that can be reliably matched by eye, thereby necessitating an automated system of matching. One such system has been developed from an algorithm originally designed for stellar pattern recognition, and is currently being employed by the ECOCEAN whale shark database [20]. This system has great potential; however, the procedure for entering and matching patterns is complex, and neither the algorithm nor results are publicly available. Therefore, a simple, yet reliable algorithm accessible to the public is needed to incorporate effectively a large number of photographs from a wide range of researchers, tourist operators and private organizations. Such a software package has recently been developed and is known as Interactive Individual Identification System (1^3S) [31,32].

Our aim in this paper is to assess the reliability of this simple, freely available software package that recognizes spot patterns for use in photo-identification studies of wildlife. Although we focus on whale sharks as an example system, the application of the computer package and the information-theoretic matching algorithms we develop can be applied to any marine or terrestrial species demonstrating some form of stable spot patterning (e.g., sharks, frogs, lizards, mammals, butterflies, birds, etc. - Fig. 1). We assess the reliability of this package by comparing known matches made by eye. We also determine the effect of variation in the horizontal angle of subjects (Fig. 2) in matching reliability, as well as how the number of spot pairs in matched images affects matching performance. All matching results are developed within a fully information-theoretic framework that incorporates all of the uncertainty associated with the matching algorithm, thus aiding users in providing reliability assessments to their matches and the resulting capture histories and demographic estimates. As such, we provide a novel and parsimonious method for assessing the reliability of pattern matching

applicable to a wide range of naturally identifiable wildlife species.

Results

13S (Interactive Individual Identification Software) matching validation

The Information Criterion weights (w) for the most parsimonious matches (w■) for the 50 matched pairs (100 images) were broadly distributed between 0.05 and 0.85, while

11

for the 50 non-matched pairs (100 images) were highly right-skewed (Fig. 3a,b). All w■ for non-matched pairs were <0.18. The median w, for matched pairs was 0.32 (± 0.05), which was much greater than the median for non-matched pairs (0.06 ± 0.01). Evidence ratios for the best-matched relative to the next-highest matched images (ER■) for known matched pairs were also highly right-skewed and ranged from 0.73 to 51.92, with a median of 7.36 (± 2.45) (Fig. 3c). ER, for non-matched pairs were all <3.5 (median = 1.21 ± 0.09) (Fig. 3d). Evidence ratios for the second best-matched relative to the

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(1)

Figure I

Example species with sufficient spot patterning that could be useful for automated photo-identification. Shown are (a) whale shark (Rhincodon typus - Photo G. Taylor) indicating the reference area defined as the area encompassed by the reference points (yellow circles); (b) spotted tree frog (Hyla leucophyllata - Photo D. Bickford); (c) northern quoll, (Dasyurus hallucatus - Photo J. Kirwan); (d) Amazon spotted frog (Hyla punctata - Photo D. Bickford); (e) striped blue crow (Euploea mulaber - Photo D. Lohman); and (f) mangrove snake (Boiga dendrophilia - Photo D. Bickford).

next-highest matched images (ER■) for known matched pairs ranged from 0.73 to 114.18, with a median of 7.57 (median (± 3.82). ER, for non-matched pairs were also all <3.5 = 1.42 ± 0.12).

Overall, 93 images out of the 50 known-matched pairs were matched correctly using 13S. w, for the correctly assigned matches ranged from 0.05 to 0.85 (median 0.36 ± 0.05), and their ER, ranged from 0.73 to 51.92 (median = 8.82 ± 2.56) (Fig. 4a,b). Known-matched photographs that I³S failed to match (7 images) had w, that

ranged from 0.05 to 0.14 (median = 0.07 ± 0.02), with
0.36).
their ER, ranging from 0.95 to 2.28 (median = 1.23 ±
Assessing 'by-eye' matches using P³S
==
Of the 33 individuals re-sighted between years in the database used by Meekan et al. [19], 10 individuals could not be matched with 13S because their images were not amenable to 13S fingerprinting (absence of reference points) or their match was not present in the database. This was because the Meekan et al. [19] study also used images from a separate database and included scar-identified individuals that were not available for photographic matching using 13S. Thus, we could only re-assess 23 of these by-eye matches that included 13 LS matches and 16 RS matches (58 images total).
Forty-eight of the 58 images (83%) from the 23 individuals were matched correctly using 13S. w, for the correctly
(median
assigned by-eye matches ranged from 0.05 to 0.53
= 0.16 ± 0.04) (Fig. 5a), and their ER, were
between 1.04 and 24.57 (median = 2.33 ± 1.58) (Fig. 5b).
Incorrectly assigned by-eye matches had w■ ranging from 0.04 to 0.13 (median = 0.06 ± 0.01) and their ER, ranged from 0.67 to 2.76 (median = 1.04 ± 0.37). 1³S also identified two images that were false positives (i.e., sharks that were incorrectly matched with other photographs) in the by-eye matching process. Neither of these images was
sharks.
matched with other known images of the identified
Horizontal angle
Mean w■ decreased linearly as the horizontal angle of subjects within images increased (Fig. 6a). Median w■ ranged between 0.92 (± 0.06) for angles of 10°, to 0.29 (± 0.13) for angles of 40°. The images of subjects at 30° had w■ approaching those of non-matching pairs, and the distri-

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D
■ Articles by Falk, D.
■ Articles by Prior, F.
Edited by Marcus E. Raichle, Washington University School of Medicine, St. Louis, MO, and approved December 7, 2006 (received for review October 18, 2006)
Because the cranial capacity of LB1 (Homo floresiensis) is only 417 cm^3, some workers propose that it represents a microcephalic Homo sapiens rather than a new species. This hypothesis is difficult to assess, however, without a clear understanding of how brain shape of microcephalics compares with that
of normal humans. We compare three-dimensional computed tomographic reconstructions of the internal braincases (virtual endocasts that reproduce details of external brain morphology, including cranial capacities and shape) from a sample of 9 microcephalic humans and 10 normal humans. Discriminant and canonical analyses are used to identify two variables that classify normal and

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(10)
(20)
(30)
(40)
Figure 2
An individual whale shark at varying angles of yaw (A: 0°, B: 10°, C: 20°, D: 30°, E: 40°). Sequences such as this were
used to assess the effect of horizontal angle on the 135 matching process.
bution of w, for images of subjects at 40° overlapped the distribution of w, for non-matching pairs (Fig. 6a).

There was an exponential decline of median ER, with increasing angle (Fig. 6b). Median ER, ranged from 69.16 (± 52.24) for images of subjects at 10°, to 1.56 (± 2.81) for images of subjects at 40°. The distribution of ER, for images of subjects at 30° approached that for non-matching pairs, and the distribution of ER, for images of subjects at 40° overlapped the ER, distribution for non-matching pairs.

Number of spot pairs

There was evidence for a negative relationship between the transformed 13S scores and spot pairs ($ER = 9.94 \times 105$, adjusted $R^2 = 0.26$; Fig. 7a), but no evidence for a relationship between w, and the number of spot pairs ($ER < 1$; Fig. 7b).

Discussion

Consistent, non-intrusive and ethically acceptable methods of mark-recapture are essential for estimating reliable demographic rates for wildlife populations, particularly for threatened species [29,33]. Photo-identification has become a widely accepted method of mark-recapture that has been empirically tested over a broad range of species [e.g., [16,17,34]]. Despite the advantages of this technique, there is the potential for large photographic databases to compromise the reliability of matches made by eye, which can subsequently jeopardize reliable estimates of population demographics. This problem has been largely overcome for several species by computer-aided image-matching algorithms that match various unique features of individuals [20,28,35-37]. However, most of these programs have limited applications, may be complex to operate, or are not freely available.

Software inaccessibility and the corresponding isolation of potentially useful photographic datasets will likely compromise parameter estimation and lead to higher uncertainty for calculated vital rates. For example, centralized photographic catalogues are common in the field of cetacean research, with new photographs from observers being compared to those previously obtained and the results sent to collaborators worldwide [38]. This type of data sharing for large, long-lived and wide-ranging species is an essential component of effective population management. Open-source matching software coupled with

matching algorithms exploiting the power of information theory will make this process more efficient and less prone to error. Our main objective was to provide a procedure for incorporating full matching uncertainty into the photo-identification process using a freely available and simple software package. Despite the relatively low number of photographs with which we tested our approach, the performance of the system is satisfactory from the perspective of estimating reliable demographic information for a host of wildlife species.

Our assessment of a simple, freely available spot pattern-matching software package coupled with an information-theoretic incorporation of matching uncertainty was particularly effective for whale sharks given that their natural spot patterns were ideally suited for assessment using the 13[3]S program. Validation of 13S matches using the Information Criterion algorithm provided a threshold w■ for known matched pairs of approximately 0.2, below which w, for non-matched pairs fell. Known matched pairs not matched by 13S, or that were matched with low (i.e., <0.2) w, likely resulted from poor clarity or high angles of yaw. This emphasizes the need to select images of the highest quality for matching purposes [39]. The validation process is necessary with most computer-aided matching algorithms because this alleviates much of the subjectivity associated with the final stage of matching. In the case of whale sharks, the 0.2 threshold proved to be a robust and conservative measure of certainty, but the particular value of the threshold will likely vary among species. Nonetheless, in the absence of validation data we suggest that using this threshold value is a good first approximation.

The validation stage of photographic matching can be further confirmed by using genetic tagging to identify individuals [15], and this approach is proliferating in mark-

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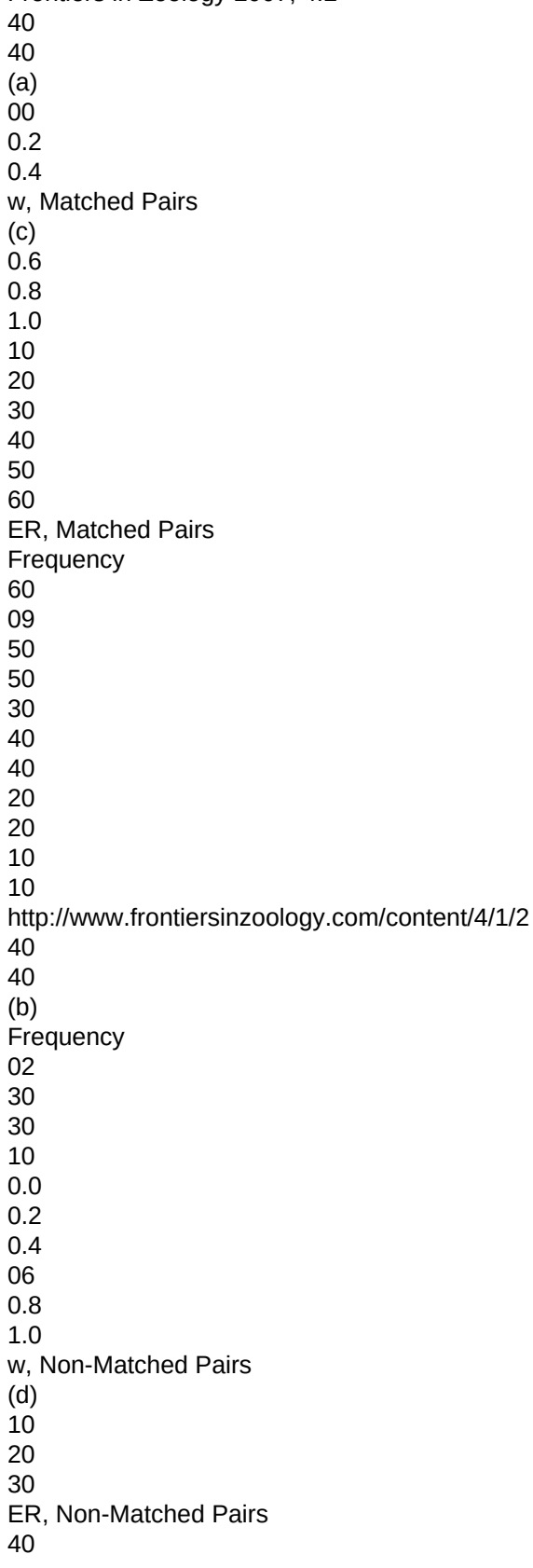
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Figure 3
1³S matching validation IC weights (w,). Distribution of IC weights for known matched (a) and non-matched pairs (b), and
P³S matching validation evidence ratios (ER,) for known matched (c) and non-matched pairs (d) are shown.
recapture studies. Genetic tagging also has the advantage of providing additional individual- and population-level information (e.g., genetic diversity, parent-offspring relationships, etc.) [40]. Because whale sharks are highly photographed and tissue sampling may be difficult, it is unlikely that genetic tagging will replace photographic identification in the near future, even though genetic information will provide further validation of photographic matching success.
The open-source program 13S [32] was effective at confirming past matches made by eye in the majority of instances. Images that were successfully confirmed using our Information Criterion algorithm received relatively

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in human microcephalics and Homo floresiensis -- Falk et al., 10.1073/pnas.0.

crocephalic humans with 100% success. The classification functions classify the virtual endocast from B1 with normal humans rather than microcephalics. On the other hand, our classification functions classify a pathological H. sapiens specimen that, like LB1, represents an 3-foot-tall adult female and an adult Basuto microcephalic woman that is alleged to have an endocast similar to LB 1's with the microcephalic humans. Although microcephaly is genetically and clinically variable, virtual endocasts from our highly heterogeneous sample share similarities in protruding and proportionately large cerebella and relatively narrow, flattened orbital surfaces compared with normal humans. These findings
have relevance for hypotheses regarding the genetic substrates of hominin brain evolution and may have
medical diagnostic value. Despite LB1's having brain shape features that sort it with normal humans rather than microcephalics, other shape features and its small brain size are consistent with its assignment to a separate species.
Author contributions: D.F., C.H., and K.S. designed research; D.F., C.H., K.S., M.J.M., T.S., J., E.W.S., H.I., H.S., and F.P. performed research; D.F., C.H., and K.S. analyzed data; and D.F., C.H., K.S., M.J.M., and F.P. wrote the paper.
The authors declare no conflict of interest.
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Figure 4
Matching validation results. Box-and-whisker plots of (a) IC weights (w■) for known matched pairs showing images
matched
matched and not matched with 1³S; (b) evidence ratios (ER■) for known matched pairs showing images matched and not
13S. Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quar-
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Figure 5
Automated versus by-eye matching results. Box-and-whisker plots of (a) IC weights (w,) for by-eye matched images that
were matched and not matched using 13S; (b) Evidence ratios (ER,) for by-eye matched images that were matched and not
using 1³S. Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quar-
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June 3, 1921

A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE

BY ROY CHAPMAN ANDREWS

In July 1919, a female Humpback Whale (Megaptera nodosa) with two remarkable protrusions on the ventral side of the body, posteriorly, was captured by a ship operating from the whaling station at Kyuquot, on the west coast of Vancouver Island, British Columbia.

Fig. 1. Caudal part of the whale, showing the hind limb in situ.

One of the protrusions was cut off by the crew of the vessel but the other was photographed in situ by the superintendent of the Station. Mr. Sidney Ruck and Mr. Lawson, officials of the Consolidated Whaling Company, appreciated the importance of the discovery and presented the skeletal remains of the attachment to the Provincial Museum, Victoria, B. C.

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(b)
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Horizontal Angle (degrees)
Figure 6
Effect of angles of yaw. Box-and-whisker plots of (a) IC weights (w■) for horizontal angle categories, where images at 0°
were matched against images skewed by 10°, 20°, 30° and 40°. Dotted lines show results for non-matching pairs; (b) evidence
ratios (ER) for horizontal angle categories, where images at 0° were matched against images skewed by 10°, 20°, 30° and 40°.
Central tendency (black horizontal line) indicates the median, and whiskers extend to 0.5 of the inter-quartile range.
low w, and ER, overall, most likely as a result of a considerably smaller sample size than that used for validation.
1³S was also a useful tool for identifying image matches

that were assigned incorrectly (i.e., both false positives and false negatives). When matching whale shark patterns by eye, the observer generally does not focus on the spot pattern per se; rather, attention is usually paid to the intricate lines and whirls (see Fig. 1a) on the flank of the shark. As such, 13S provides an unbiased method of matching natural markings that is relatively immune to user subjectivity.

We found strong evidence that horizontal angle of subjects within images affects the ability of the 13S algorithm to make reliable matches. As the horizontal angle of subjects in images increases, the matching likelihood decreases. Angles of yaw up to 30° compromise the matching process even though many of these images were still matched correctly. Conversely, images with angles of yaw ≥40° will more than likely be incorrectly assigned. Due to the linear algorithm used by 13S to match spot patterns it is important to use only those photos with as little contortion of the reference area as possible. Likewise, the number of spots annotated in fingerprints can also potentially affect the 13S matching process. The higher the number of spot pairs matched, the lower the I³S score and hence, the higher the matching certainty. This corroborates similar findings from a study of Carcharias taurus [31] and emphasizes the benefit of using information-theoretic measures of matching parsimony because the updated algorithm takes relative match uncertainty into account.

The number of suitable images from our database for use in 1³S was considerably reduced due to the absence of reference points, poor image quality and oblique angles of subjects in many images. The rejection rate is inflated particularly by the use of photographs taken without the explicit aim of photographic matching because many are derived from ecotourism operations. However, the efficiency and reliability of matching with 13S more than compensated for the reduced sample size. The number and size of images in an 13S database can potentially slow down the program's operating speed; therefore, it is ideal to scale down the size of photographs and only include the best image of a particular animal. In addition to horizontal angle, roll and pitch of sharks in images may affect the matching process. Pitch seems likely to be only a minor problem because digital photos can be rotated so that the animal is aligned with the horizontal. We had few

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dog-log |'S Scores
-2.0
-1.8

-1.6
Figure 7
-1.4
-1.2
-1.0
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(a)
1.10
1.15
1.25
1.20
1.30
Logo Number of Spot Pairs
1.35
1.40
clog-log w■
-1.5
-1.0
-0.5
http://www.frontiersinzoology.com/content/4/1/2
Effects of spot-pair number. (a) Relationship between complementary log-log-transformed (clog-log) 13S scores and logio-
transformed number of spot pairs. The fitted line illustrates the correlation observed using a linear regression; (b) Comparison
of clog-log-transformed w, with logo-transformed number of spot pairs.
1.10
1.15
1.25
1.20
1.30
Log10 Number of Spot Pairs
1.35
1.40
images of the same individual at varying angles of roll, so we were unable to examine this potential problem.

Conclusion

The application of 13S to any animal with a unique, stable spot pattern holds particular promise for mark-recapture studies. The program is particularly well suited to organisms that have minimal contortion in the desired reference area and have spots that are relatively homogenous in diameter and size. Large, irregular spots may cause problems during fingerprinting because the centre of the spot may vary according to the user's preference. For example, a species with a spot pattern that may not be well suited to 13S is the manta ray (Manta birostris) due to its large, sparsely spaced and irregular ventral spot patterns [41]. However, other species of ray such as the white spotted eagle ray (Aetobatus narinari) have evenly spaced and relatively homogenous spot patterns on the dorsal surface that would lend themselves more readily to the fingerprinting process. Other organisms that are potentially suitable candidates include: felids, some cetaceans, many

birds, amphibians and reptiles, and other elasmobranchs. The benefits of non-intrusive mark-recapture studies are numerous, not only in terms of animal welfare, but also from a logistical perspective. The software availability and applicability of 13S for a wide range of animals will enable researchers to store and match images for mark-recapture purposes, thus hopefully contributing to robust and more precise estimates of key life history parameters. Reliable, effective photo-identification for animals with stable, natural markings is now possible for anyone armed with a digital camera.

Methods

Whale shark photo library

The library contains 797 photos taken by researchers and tour operators during the months of March-July from [AD] 1992-2006 at Ningaloo Reef (22° 50' S, 113° 40' E), Western Australia. The method of image capture varied over time, so that still, video and digital images were all included in the library. A 'by-eye' comparison of 581 images in this photo library, (this total excludes several images collected in the 2001 season, as well as all photos collected between 2003 and 2006), was originally completed. During analysis, photos were sorted into quality classes on the basis of clarity, angle, distinctiveness, partial image and overall quality [39]. More details of the manual matching procedure are provided in reference [19].

(b)

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At my request, Mr. Francis Kermode, Director of the Provincial Museum, very courteously submitted the bones to me with permission to publish upon the result of my examination.

Under date of March 4, 1920, Mr. Ruck writes to Mr. Kermode as follows:

I enclose herewith three photographs showing the unusual development of the pelvic Rudiments in a whale captured at the Kyuquot Station last July, of which you have the bones. It is to be regretted that better pictures in evidence of this unprecedented development were not obtained.

I have been connected with the Whaling Industry for 22 years and during my time have come in contact with prominent Naturalists such as Professor True of the Smithsonian Institute, Professor Lucas of the Natural History Museum, Brooklyn,' and Professor Andrews of the Natural History Museum, New York, and neither in their experience or mine have the protrusion of the pelvic bones beyond the body ever been seen or heard of.

This particular whale was a female humpback of the average length with elementary legs protruding from the body about 4 feet 2 inches, covered with blubber about one-half an inch thick.

As shown in the best photograph these legs protruded on either side of the genital opening; the left leg was cut off by the crew of the vessel and lost, and the point at which it was cut off is clearly shown in the photograph. The end of the leg seen in the picture terminated in a kind of round knob like a man's clenched fist.
The two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches, and possibly more by this time. At any rate the total length of the leg before it was cleaned of the blubber and flesh was, as before stated, about 4 feet, 2 inches, from the body.
After studying the material and discussing it with various scientists, I have come to the conclusion that the protrusions actually do represent vestigial hind limbs and show a remarkable reversion to the primitive quadripedal condition.
I am well aware that zoologists are inclined to accept reported instances of reversion with extreme reluctance and that, at first sight, the tendency will be to consider this a teratological case of no reversionary significance, but the evidence is so strong that I can not interpret it in that way.
Mr. Ruck reports that the total length of the leg "before it was cleaned of the blubber and flesh" was about four feet and two inches. The skeletal remains in my possession consist of two bones and two heavy cartilages. When placed in position as in Fig. 2, the total length is 31 inches.
Then of the U. 8. National Museum, now of The American Museum of Natural History.

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Matching software and fingerprint creation
The software we used to generate potential image matches was originally designed to match natural variation in spot patterns of grey nurse sharks (Carcharias taurus also known as the "ragged-tooth" in South Africa and the "sand tiger" shark in North America) [31]. This software - Interactive Individual Identification Software (I³S) - creates 'fingerprint' files and matches individuals by comparing particular areas demonstrating consistent spot patterns. We chose to examine the area on the flank directly behind the 5th gill slit as the most appropriate for the individual identification of whale sharks. This decision was based on spot consistency identified in previous studies and due to the ease with which photographers can view this area [19,20]. The positioning of spots in this area was also less likely to be distorted due to undulation of the caudal fin, which may affect the software's matching success.
At least three reference points are required by I³S to construct a fingerprint [31]; we chose the most easily identifiable and consistent reference points visible in flank photographs: 1) the top of the 5th gill slit, 2) the point on the flank corresponding to the posterior point of the pectoral fin and 3) the bottom of the 5th gill slit (Fig. 1a). The requirement of all three reference points to be visible in the photograph for a fingerprint to be created meant that

not all 797 photos could be used. As such, we could compare 433 (54%) of the original photographs, of which 212 were of the left side (LS) and 221 were of the right side (RS) of the shark.

In this updated database, images were matched by an operator highlighting spots within the reference area on a computer screen. Three initial reference points for each image were entered (Fig. 1a), followed by the manual adding of a digital point to the centre of the most obvious spots within the reference frame. Using a search function, the software compares the new fingerprint file against all other fingerprint files in the database by using a two-dimensional linear algorithm, which is simply the sum of the distances between spot pairs divided by the square of the number of spot pairs [31]. The matched spot pairs with the minimum overall score (ranging from 0 [perfect match] to a value <1) is the most likely match. The program also lists the next 49 most likely image matches, which it ranks in decreasing order of likelihood. A search result output text file provides a list of the 50 matches, spot pairs compared, as well as a matching score. We then incorporated the 13S text output into the R Package [42] for further analysis [see Additional file 1].

Information criterion algorithm

To provide a measure of match parsimony based on the philosophy of information theory and to compare possi-

ble image matches in a multi-model inferential framework [27], we modified the match score in the following manner: (1) we first back-transformed the spot-averaged sum of distances to a residual sum of distances, which was simply the spot score (SS) multiplied by the square of the number of matching spots (n); (2) we then created an information criterion (IC) analogous to the Akaike and Bayesian Information Criteria [43,44]:

IC=2k+n'loge

SS n

n

where k = an assumed number of parameters under a simple linear model (set to 1 for all models) and n' = 100/n that accounts for the fact that an increasing number of spots automatically leads to a higher SS (the 100 multiplier scales the term to be >1); (3) finally, we calculated the IC weight (w) as:

W■ =

-0.5-AIC,

e

711

ΣAIC

1=1

where AIC IC - ICmin for the ith image (ith 'model') from 1 through m (where m = 49). We also calculated the information-theoretic evidence ratio (ER) [27] for each

matched image relative to the top-ranked image based on the w to provide a likelihood ratio of match performance. Here, ER, is the w of the top-ranked matched photograph divided by the next most highly ranked photograph's w, ER2 is the w of the top-ranked match divided by the w of the third-best match, and so on. Therefore, ER, provides a likelihood ratio for the match of the top-ranked photograph relative to the next most highly ranked photograph.

Match validation

To establish the ability of the w, and ER indices to assign reliable matching, we endeavoured to establish a threshold value of w, and ER, below which matching uncertainty was too high to match photographs reliably. We therefore validated the approach by applying our algorithms to a sample of 200 images; 25 known matched pairs (i.e., matched by eye) from both the LS and RS databases (100 images total), and 25 non-matched pairs from both LS and RS databases (100 images total). The LS and RS images were analyzed separately, using text outputs from 13S that report the candidate matching image names, 1³S matching scores and the number of spot pairs matched. A match was considered successful if the corresponding image was ranked at the top of the list of potential matches (i.e., number 1 of 50).

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Assessing 'by-eye' matches using 1³S

Thirty-three individual sharks were re-sighted inter-annually during the manual 'by-eye' analysis of the raw photo library. Of any two by-eye matched images, one of the pair was entered into either the LS or RS database and searched. A match using 13S was considered successful if the by-eye matched images were ranked as the most likely match (as with the validation test) and confirmed using the IC algorithm.

Horizontal angle (yaw)

Footage of 10 different sharks (5 LS and 5 RS) was used to capture sequences of five images of each shark, where subjects were on varying horizontal angles (0°, 10°, 20°, 30° and 40° - Fig. 2). The angles of yaw were estimated using Screen Protractor software. Fingerprints were created for each image with 20 spots annotated per fingerprint. The 10° images were searched against the 0° images and 10 non-matching images. This process was repeated, substituting images where subjects were on angles of 20°, 30° and 40° for both LS and RS image sequences. Five random, non-matching pairs were also searched against 0° and 10° images, and then repeated for 20°, 30°, and 40° images. This allowed for a comparison between matching

and non-matching pairs while testing for the effects of horizontal angle in images. Results were analyzed using the IC algorithm applied to the match validation and by-eye comparison tests.

Number of spot pairs

Fifty known-matching pairs were compared to one another in 1³S. Of these matching pairs, only those successfully confirmed during validation of 13S matches were included in this test. 13S scores were compared against the number of spot pairs matched. The w, for each image was also compared against the number of spot pairs matched by the IS algorithm. A complementary log-log transformation (clog-log) was applied to normalize the distribution of 1³S scores and w■, and a log10 transformation was used to normalize the distribution of spot pairs. We tested for a linear relationship between the transformed variables using least-squares regression and information-theoretic evidence ratios. Goodness-of-fit was assessed using the least-squares R^2 value.

Competing interests

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Additional material

Additional file 1

R code to calculate Information Criterion (IC) weights for match parsimony. Full instructions for use of R code are contained within the text file

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[http://www.biomedcentral.com/content/supplementary/1742-9994-4-2-S1.txt]

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The author(s) declare that they have no competing inter-
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Authors' contributions
CWS, CJAB and MGM designed the study, CWS and CJAB did the analysis, and all authors contributed to writing the paper. CWS did most of the analysis with assistance from CJAB, and CWS took the lead in writing the manuscript.
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Fig. 2. Skeleton of the hind limb.
Fig. 3. Cartilaginous femur and osseous tibia.
Fig. 4. Cartilaginous tarsus and osseous metatarsal.

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Additional material

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The author(s) declare that they have no competing interests.

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Authors' contributions
CWS, CJAB and MGM designed the study, CWS and CJAB did the analysis, and all authors contributed to writing the paper. CWS did most of the analysis with assistance from CJAB, and CWS took the lead in writing the manuscript.

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FEMUR. The larger bone is deeply concave proximally and to it is attached a massive cartilage (Fig. 3) which, in its present shrunken condition, is 5% inches in length and 1% inches wide. I estimate that this cartilage was at least 15 inches long and 3 inches wide when fresh. I believe that this cartilage represents the femur. It probably lay entirely within the body, its proximal end being attached to the pelvic vestiges. Such a massive cartilage must necessarily have had a firm support and leads me to believe that the pelvic elements in this individual were of extraordinary size. The pelvic bones, as usually present in the Megaptera, are slender ossifications about 6 or 8 inches in length and would not furnish a firm enough base for the attachment of a cartilage which, in its fresh condition, was as large as a man's wrist. Since the photograph of the limbs in situ shows that they were directly below the usual location of the pelvic vestiges and since there are no other "floating" bones near this region, the conclusion that they were attached to the pelvic elements is entirely justifiable.

TIBIA. The larger of the two bones I identify as the tibia (Fig. 3). It is 14% inches in greatest length, is well developed, and has a hard, smooth outer surface. At the proximal end its greatest width is 3%, inches, it narrows gradually for three-fourths of its length, and then suddenly expands at the distal extremity, where it is 2½ inches wide.

TARSUS. The distal end of the tibia is convex and gives attachment to a cartilage which in its shrunken state is 4% inches long and 1% inches wide (Fig. 4). This cartilage, I believe, represents the tarsus. That it presents no ossifications is by no means surprising as the carpal bones in the fore limbs of cetaceans are sometimes entirely absent and often in a more or less rudimentary condition. Mr. Ruck says "the two bones of the leg which you have are connected by cartilage which I was informed had shrunk about 10 inches and possibly more by this time." This would give the tarsal cartilage a length of nearly 15 inches.

METATARSAL.-The distal element in the leg is a hard, well-developed bone which I identify as a metatarsal (Fig. 4). It has the characteristic shape of the metacarpals in the fore limbs of cetaceans except that it is more slender. It is 6% inches long, 1% inches wide proximally, and 1% inches in distal width; its least width is 16 of an inch. To the distal end of the metatarsal is attached a heavy cartilage of which only ¾ of an inch remains intact. This cartilage probably formed the extremity of the limb skeleton.

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EXTERNAL APPEARANCE OF THE LIMB.-In reference to the limb as it appeared in the fresh condition, Mr. Ruck says that the end terminated in a "kind of round knob like a man's clenched fist," that the total length was about four feet and two inches, and that it was covered with blubber about one-half inch thick. I infer from Mr. Ruck's description that the connective tissue and blubber were essentially the same as in the flipper, or fore limb, of cetaceans. The photograph of the limb in situ (Fig. 1) show that there are two prominent, truncated tuberosities on the distal half. The proximal "bunch" evidently indicates the distal end of the tibia and the other is at the extremity of the metatarsal. These tuberosities may very properly be homologized with those on the outer, or anterior, edge of the flipper in the Megaptera which indicate the extremities of the radius and the second digit. This is, I believe, a point which has considerable significance.

Since the stalk-like cartilaginous femur probably lay entirely within the body and the remainder of the limb entirely outside, there was undoubtedly a certain flexibility at the point of junction with the body.

In a paper entitled 'Untersuchungen an walen," Professor W. Kükenthal has described external rudimentary hind limbs in three early embryos of Megaptera. These appear as two more or less caudally directed papillæ on either side of the genital organ in the same relative position as the hind limbs which I have described in this paper. In Kükenthal's Stage I (an embryo 32 mm. in length) the rudiments are best developed and are 12 mm. long. In Stage II (an embryo 28 mm. long) the rudiments are somewhat less distinct, reaching a length of # mm. In Stage III (an embryo 30 mm. long) the hind-limb rudiments have still more decreased in size and appear as minute papillæ. Kükenthal has also discovered hind-limb rudiments in embryos of Phocæna communis and P. dalli, and Guldberg has recorded them in embryos of Lagenorhynchus acutus and Phocæna communis. Kükenthal states that the hind-limb rudiments are found in later embryonic stages of the Mystacoceti than in the Odontoceti and concludes that in the evolution of cetaceans the hind limbs lost their functional character in the Odontoceti earlier than in the Mystacoceti. Since Kükenthal's and Guldberg's researches have shown that external hind-limb rudiments are still present in some cases in embryonic life, it is by no means impossible that, these vestigial organs should continue their growth and persist until the adult stage. I believe that

Jenaische Zeitschrift für Naturwissenschaft, LI, 1914, pp. 49-52.

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that is exactly what has occurred in the specimen which I have described above, and that we are confronted with a clear case of partial reversion to a primitive quadripedal condition.

The limbs, according to the statements of the whalers, were symmetrical; they are in the exact position in which the hind-limb rudiments

have been found in embryonic Megaptera; there are strong indications that the cartilaginous femur was attached to the pelvic elements; they are homologous in many respects to the flippers, or fore limbs, and, were this a teratological case, it is doubtful if these homologies would exist. Unwilling as are many evolutionists to accept reported cases of reversion, I can see no other explanation for the facts presented here. That this condition is extremely rare must certainly be true for, so far as I am aware, this is the only recorded case among cetaceans. The presence of rudimentary hind limbs would almost certainly attract the attention of whalers under any condition and eventually be reported to a scientific institution, as was done in the case under consideration. Although hundreds of thousands of whales have been killed, especially in the last fifty years since the beginning of shore-whaling, no other instance has been reported. We are greatly indebted to Mr. Ruck and Mr. Lawson for their quick appreciation of the importance of their discovery and I wish again to express my thanks to Mr. Kermode for giving me the privilege of describing it.

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AMERICAN MUSEUM
NOVITATES
FRANK E. LUTZ, Editor
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forms, and similar matters.
The articles are numbered serially
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will be provided for each 300 (approximately) pages.

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AMERICAN MUSEUM NOVITATES
No. 9
A REMARKABLE CASE OF EXTERNAL HIND LIMBS IN A HUMPBACK WHALE
BY ROY CHAPMAN ANDREWS
THE
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SCIENCE
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Saturday
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Bird still elusive or extinct
Tuesday, May 01, 2007
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COLUMBIA After five months of looking, a team of Cornell University researchers have failed to find ivory-billed woodpeckers. The birds are feared to be extinct and have not been seen in the Congaree's old-growth forest since the 1930s

Despite the failure, the searchers came away impressed by the Congaree National Park, South Carolina's only national park. "It's the only place in all of the Southeast that has the old growth and the high tree diversity," said Martjan Lammertink, the Dutch native leading the Cornell search team. "It's not just the big trees, it's the whole multilayered structure of the forest."

The team still thinks the 24,600-acre park is one of the most likely places for the "ghost birds" to be.

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Lammertink has heard what he thinks was the ivory-billed's distinctive double-knock deep in the Congaree forest

A videotaped snippet of an alleged ivory-billed in an Arkansas swamp two years ago regenerated the effort to search for the bird throughout the Southeast and that led to the Cornell mobile team.

APRIL SHOWERS BRING MAY

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New Zealand news on Stuff.co.nz - Printable
Page 1 of 2
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Tuesday, 08 May 2007
DNA test to see if 'extinct' quail survived 102
years
An isolated population of quail on Auckland's Tiritiri Matangi Island is thought to be a native species regarded as extinct for 102 years.
A Massey University researcher, Mark Seabrook-Davison, is carrying out genetic tests on the tiny

ground-dwelling birds to confirm they are survivors of the New Zealand quail thought to have been extinct since about 1875.
"At this stage, the notion that these quail may be a surviving group of New Zealand quail is quite speculative," Mr Seabrook-Davison told the university's newsletter. "It's also been suggested that they may be a hybrid".
The New Zealand quail, coturnix novaezelandiae, were once abundant throughout the mainland and on Great Barrier Island, but are recorded as the second bird species to be wiped out during European settlement.
Seabrook Davison, part of the university's Auckland-based ecology and conservation group, said that quail were known to have been on Tiritiri Matangi for at least 100 years.
Genetic testing will be carried out at the university's Albany campus, to compare the birds with samples from museum specimens, and with introduced Australian quail.
The Australian brown or swamp quail - thought to be similar to the NZ native but half their size - californian quail and bobwhites are all established in the North Island for recreational hunting.
Mr Seabrook-Davison said that if the Tiritiri Matangi birds are shown to be native survivors, the find could also have important implications for future conservation projects in the Hauraki Gulf islands.
"There is keen interest in the possibility of putting these quail on to other islands," he said.
"Because they are a ground bird of a particular type, they play their own part in the bigger ecological picture. They are very good at distributing seeds and tilling the leaf litter.'
Some ornithologists have expressed doubts about the possibility that the Tiritiri Matangi birds are native quail. Australia's brown quail are a different genus from the NZ species, so would be unlikely to have interbred with them.
Sir Joseph Banks reported sightings of the NZ quail about 1770 in his journal of James Cook's first voyage and the first specimen was formally described in 1827 near Thames.
But by 1840 it was less common, and in 1865 the population plunged in the South Island - apparently because its tussock grassland habitat was being destroyed by fires clearing land for farming.
Known to the Maori as the koreke, it was regarded as having been completely exterminated in the North
Island by 1870, and the South Island populations had also vanished by 1875, according to the

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Encyclopaedia of New Zealand.
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Helping Solve the "Other" Taxonomic Impediment:
Completing the Eight Steps to Total Enlightenment and Taxonomic Nirvana
NEAL L. EVENHUIS

Department of Natural Sciences, Bishop Museum, 1525 Bernice Street, Honolulu, Hawai'i 96817, USA; email: neale@hishopmuseum.org
"To discover is to draw the veil. It is not to run into something and keep it to oneself. It is to push back the frontier of infinity and to pass the news on to posterity.
-Mauricio Obregón
Background
Simply put: despite over ten years of recognizing the problem and giving it a catchy phrase, we still lack the taxonomic expertise to effectively describe the remaining biodiversity on earth. How can we enjoy and protect something if we don't know it is out there to enjoy and protect?
The Conference of the Parties to the Convention on Biodiversity (COP) at their meeting in Jakarta in 1995 echoed the warnings of previous committees organized around the world to outline the problems we face in the future of taxonomy. The perception by the COP of a lack of taxonomists to handle the enormous task identifying and naming the biodiversity we have yet to describe on this earth led the IUBS/Diversitas to term this lack of expertise as the taxonomic impediment Elame Hoagland (1996) highlighted the term in her white naner on the subicct for the COP Her naner precipitated an overwhelming chorus of "I second that w fellow taxonomists as well as in their subsequent discussions that fine-tuned proclamations of the need and the methods which we could solve the problem
Two years previous to Fioagiana s report the Science Foundation (or created in FEET program (Partneramins for Enhancing Fomenise in laxonomy) to enhance and increase taxonomic extrine in areas where it is dcctic UV COLcagues and Nor review paneis to be sorely lacking cine years tatter Nor proudly declared Taxonomic impediment Uvercome (odman & Loay 2003). The article's headline may have occm a bit more HOCHISHTIC at reaLY, QUI INCVCrticless, the coin NSP In Cratung uic rer I pro-eram--and also at about the same time the hotic barveys and Inventories Program (1) meant to foster proauscate conccune at discovery of species troughout the world cannot be understated they were not major leans forward in showing the world that governments could in fact net behind taxonomy and support mer Caste Inc expertise that was tacking at discrome and cicat steps to reining sorve at UCTEL
Whic even the most recent editorials on the taxonomic impediment and that respective responses fe wrocier et m 24 LV dc wietzmann 24 Mart 2014 recta er at Rusev et at 24 Young 2004: Carvalho ef al Zubi may aroue the details they clearly all agree with each other that we still lack taxonomic expertise to adequately describe the prodiversity on us planet (towever, they a nave apparentiv missed another taxonomic impediment one that darkens the notential successes made by Nal funding and OUNT Suvances name, na sumc O CISUITZ CINCTomisis are O GO ITUC or even any taxoDOTIV
Numerous reasons exist for this uninunate duemma ise Summary below) Some that are wherenth
Earlier uses of the pisse vonomic impediment (eg Taylor 1976 Ramany, 1986, Mcimyre er af 1992)
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common in collaborative survey work are outlined here with examples from a recently-funded NSF BS&I

terrestrial arthropod survey in Fiji. That discussion is supplemented with a step-by-step process that explains
the process of taxonomy and the sociological pros and cons to each step; and, if followed correctly by all
taxonomists, will ultimately solve this "other" impediment.
"Cool. Gimme a free trip to Fiji"
Caveat: The Fiji BS&I Survey is very successful and it is only because it is that I can safely write this article warning of
some of the pitfalls that may befall someone who tries to organize such a collaborative survey.
Among the many tasks in formulating a logical process and project design to the initial NSF Fiji Terrestrial
Arthropod Survey (termed henceforth as "Fiji project") was creating an essential team of experts who would
be critical to the success of the project by identifying taxa in their specialty group(s) [= target group(s)] and
describing new species that was resulting from the massive Malaise trapping program that was already in
place on many of the islands scattered throughout the Fiji Archipelago. To sunniement and enhance the identi-
fication and description of those selected biodiverse elements in Fiji, team members were asked to parucipate
in all-expenses-paid collecting inps to Fi to personally collect their target group by whatever specialized
method they deemed most appropriate and to help train in-country smudents and parataxonomists, the latter
who were conloved in collecting sorting and identifying the specimens collected primanly by Malaise trans
and leat-tier catches.
A certain amount of trust was put into cach participant that they would indeed take the time out of their
busy schedules and volunteer their efforts toward failing the oectives of the grant and describe the biodi-
verse taxa they stated existed in Fin For the most part this imist was reciprocated by diligent reporting of the
identifications of material they were being sent and in submissions of their manuscripts to the journal series
created and dedicated to the Fi proiect For Arduous Finis difpcnce was not always the casc Allicam
members were told they could participate in a trip to Fin under the condition that they would submin before or
soon afterwards a manuscript describing any new taxa discovered Unfortunately in some cases no such pancr
ever was forthcoming.
Tabi i sous the list of the tared taxa of the Fun proiect the known mumber of species prior to inc incon
on of the protect the csumated new taxa that would be found in fin. and how many new species were Dub-
ished or in ress/in preparation since the Fin proiect Depan The names of specialists and their target taxa are
not included out the numbers are real. identifying those who did not meet their original expectations of the
protect by name or taxon is not the porose of this paper it is to illuminate the problem and offer a solution to
IL
After not getting the number of manuscripts I had honed for from some team members or even promess

reports from them of what taxa nad been identified by them. I began to think that the only reason some partic-
manis signed on to the project was merely to pet a free trip to Fii soak up some sun po codiceling go back to
their ians with their booty, and reminisce with dietal pictures and collected specimens of the pleasant -14
day they had amongst the warm climes and friendis pcopic of that South Pacific island nation This of course. Would not only be disingenuous to the proiect but also to science. And especiativ to Nor and the
republic of Fin since the Bone Surveys and inveniones program was created to conduct broadscale collect-
ing. Toster descriptions of new Tax and require voucherine of specimens in the nome nation ci protect are essentially taxonomic canacity-midis nograms and they also assist with folding infrastructure m-
Country where needed. Since the finances of the Pm Government were such that they looked forward to and
sirongly encourared outside funding to help such programs as ours in their country our obligans and responsibility to the island nation of i were immense
EVENTIUS

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TABLE 1. Original and Added* Target Taxa for the Fiji project.
Taxon Group** Known Spp. Estimated New Described new or
Notes
(In Press/in Prep)
A
40+
>15
0(0)
B
10+
>10
2(3)
C
5+
>20
0(0)
D
5+
>10
4(2)
E
40+
>10
0(0)
F
50+
>10
0(1)
G
50+
>50
0(0)

H
20+
>50
10(15)
20+
>50
3(0)
n. spp. described by a non-NSF participant
J
50+
>20
4(3)
K
50+
>50
0(5)
L
>10
3(8)
M
20+
>50
0(0)
N
>20
3(10)
>50
0(0)
P
20+
>20
0(1)
ORST* #
10+
>10
0(0)
<5
>10
0(0)
0(0)
<5
>10
0(0)
U
<5
all new spp. described
added after project was funded but worked on by original NSF participants
may be families, orders, or classes, 17 different taxonomists signed on to work on these 21 taxa (some working
on more than one taxon group)
But all the participants in the Fiji project are good-natured and honest colleagues who were chosen not only for their expertise with their taxon, but because they showed a genuine interest in the Fijian arthropod

fauna. What then could be the reason for their inactivity of some in publishing? Brian Brown [also an orga-
nizer of a NSF-funded BS&I survey: in Colombia] (2005) opined in his analysis that the lack of resources for
Diptera taxonomists may have been the reason for so few papers on Neotropical Diptera being published
despite the Malaise trap catches of his study and a few others showing the greatest diversity in insects being
with the Diptera specimens collected. A paper written over 50 years ago (Hedgpeth et al., 1953) essentially
said the same thing. Apparently not much has changed. I agree that there is indeed be a lack of proper resources for taxonomists in some institutions and this has had a significant impact on the taxonomic produc-
tivity of
many researchers, but this is not the only reason for so few papers being published.
in speaking with NSF staff and organizers of other BS&I surveys I found that the inactivity in publishing was found not only in our Fin project but seemed to be an inherent factor in virtually every collaborative sur-
vey con undi au puncations of new and as HIC OF CAD one agice is done weIN WHICH
Signing up 10% a survey DROICCL an organizer would expect DCSON LO COC Ouen with the DIOMIC
guous however, US Would always the c
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HELPING SOLVE THE ULK TAXONOMIC IMPEDIMENT
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describing new species. Were employers and taxpayers then funding taxonomists to do only part of the job?
Was the NSF-PEET program funding students to be trained in actually describing organisms or were they
being trained to only go through a portion of the taxonomic process and then get stuck part way through?
Let's examine the Fiji project participant's productivity (or lack thereof in certain cases) and then follow along as I offer possible reasons for this inactivity and a step-by-step process that if followed by all taxono-
mists, will solve this problem.
The "Dog-Ate-My-Homework" Excuse and Other Syndromes
Factors to consider
Examination of Table 1 above shows a marked amount of inactivity by some project participants in describing
the estimated new species. There are a number of factors that contributed to some of the inactivity, but not all
of the inactivity. In prodding and querying team members on when they expected I might eventually see a sub-
mitted a paper, they offered a number of excuses: some reasonable, but others verging on pathetic and remi-
niscent of childhood excuses to their teachers for not turning in homework. It became obvious that publishing

was a chore and not a priority for these latter cases. For them it was like having to eat your vegetables as a kid:
Some kids ate them at the beginning so that the bad taste would not be the last taste in their mouth; while oth-
crs opted to wait until the end because it the most horrible part of the meal and casical to put it off as long
possible i was apparently experiencing the latter school or thought on vegetable canng
1. Reduction of project term
ine rill project was originally proposed to NSP for three years. the grant was approved by Nor but the funding was reduced by about 10% from what we had originally proposed It was ded that the best approach to still conduct the project with the reduced funding would be to reduce the term of the project from
Uite years to two years. Although we met the project goals of a complete checklist bibliography, database.
and training of in-country smaents in those two years, the cutting back of one year from a three-year survey
proiect ultimately had an impact on the process of identification description and publication of new species
iel inis cuinack apparently impacted only some, because others were obviousiv not impacted at all and were
able to publish quite effectively
ine publication process usually involves a number of months of review editing, and printing netore pun-
lication Knowing this and that we had a one-year reduction in time. It was decided to create a cr-reviewed
journal series dedicated to the protect and curled and reviewed in the same expcdnca manner as Zooteca. ims
allowed a remarkable successful publication of issues of Fin Arthropods wherein were published 22 papers
by 15 aumors describing 02 new species from Fi and related regions in just two years. whereas only a Trac-
tion of these papers and resulting new taxe might have seen publication under a more "normal" jumal pro-
2. Unforeseen obligations
When signing on to inc in proical one must assume inalinos parcipants agreeing to collaborate all had every desire to contribute to the prolcu in as full a capacity as their time allowed However, in the time
between submittal of the proposal and the notice of award from or about 3-6 months, some of the partici-
punts discovered that they had other gran obligations, family obligations large book projects, or sabbaticals
that took them away from the ri project in most cases, these absences from the project were for a few months to a year but not the full the years. Thus, one would sull expect at least a portion of the original esti-
mated expectations from these participants
LOOMA 1951
agona i CSS
EVENHUIS

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The Real Reasons
Of the original 19 participants who agreed to collaborate on the project, I analyzed the publication output of

five who I categorized as having little or no excuse for not publishing in order to ascertain if there was a pat-
tern in their lack of productivity. I searched Zoological Record for the years 1997 to 2006 inclusive to find
their relative taxonomic productivity in the last 10 years. The results are presented in Table 2. Authorship of
papers was recorded only if they were senior or sole author of a taxonomic paper to reduce any possibility of
giving undue credit to someone for possibly attaching their name onto someone else's taxonomic work. There
to the overall analysis.
was only one junior-authored taxonomic paper found for these five people, and was ultimately of little impact
[AD] TABLE 2. Ten-year taxonomic productivity of 5 original Fiji project participants from 1997-2006.
Scientist
Papers published
A
B
C
D
E
totals
New Taxa published
The results of the analysis in Table 2 show essentially an average of less than half of one paper per ten years per person and also less than one new species described per ten years per person. Surely this negligible
effort is not doing much at all to help solve the taxonomic impediment.
That small fraction of participants in the Fiji project in Table 2 who were slow to publish on the new spe-
cies found during the survey are, I contend, victims of the taxonomic process and their own addictions to the
"hunt" [= collecting], "discovery" [= sorting of new taxa], combined with an avoidance of "eating their vege-
tables" [=ic. having to sit down and do the humdrum work of describing a species]. They followed the steps
outlined below but would ultimately get stuck at one point and would not be able to progress further. Going
out and collecting and even sorting and finding new taxa was reward enough for them. The drudgery of hav-
ing to write and/or type up a decription was the smallest blip on their radar screens of it wasn't even present. Constant prodding sometimes moved the description of a new species up the prionty list for some.
but for os, no amount of prodding of gentic persuasion would bulge that person beyond the early sicps-
thus, they would unfortunately fail in completing the steps in the taxonomic process.
So. what are these steps? I caft diem the Ereht Steps to Exiteitenment and Taxonomic Nirvana. That is, if
one follows them all. there is no doubt that the gods of taxonomy will be looking kindly upon them for achiev-
ing success and helping fill in the jigsaw-puzzle picture of life on this planet. With constant taxonomic pro-
ductivity, that picture will become more and more complete
The Light Steps to Enlightenment and Taxonomic Nirvana
1 Realizing and embracing the enjoyment of natur
Realizing and embracing the enjoyment of callerring

3. Realizing and embracing the enjoyment of sorting
4 Realizing and embracing the enjoyment of the discovery
HELPING SOLVE THE OTHER TAXONOMIC IMPEDIMENT
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[PAGE BREAK]

5. Realizing and embracing the enjoyment of researching taxonomic literature
6. Realizing and embracing the enjoyment of describing
7. Realizing and embracing the enjoyment of submitting your manuscript for publication.
8. Realizing and embracing the enjoyment of educating others
The Step-By-Step Process
Step 1. Realizing and embracing the enjoyment of nature.
This is the critical first step in the process. If one does not like nature, there is definitely no future for that person in taxonomy. Most who fail at this Step ultimately become accountants.
As biologists, we should all be able to achieve this Step with no problem. We appreciate our surroundings and ask questions about them, we are normally curious at how things work in each ecosystem, and we generally embrace and enjoy the complexity and beauty of the world we live in.
Ways to Success: A normal first thing for most taxonomists to do at this step is to select an area in which to explore and discover, travel to, and arrive at this particular area. Often these areas will be unexplored or little-explored areas, or they may be areas that are known to harbor an unusual organism or a great abundance of different organisms.
Hedging at This Step. Reading about an area and not physically visiting it does not necessarily qualify as properly completing this step. However, vicarious pleasures are the only way for some folks who do not or cannot leave the lab yet they still adequately complete the later steps in this process.
Step 2. Realizing and embracing the enjoyment of collecting specimens.
This is the "exploration" step of the process. Sociologists have pegged most of us humans as instinctive "hunters" so collecting is essentially the "hunt" our ancestors HAD to do in order to survive. Some of us are better hunters than others. Those that aren't no doubt become scientific illustrators or molecular biologists
Ways to Success: To successfully complete this step, one must set up a trap, use one's hands, or use a tool in order to procure said organism. For botanists, this is most often ripping a plant away from its substrate and placing in old newspapers or small envelopes. For zoologists, tools are normally used to immobilize the organism because the hunt involves a prey item that moves and has what is called an "avoidance mechanism" --and they usually move away rather quickly from someone trying to remove them from their native habitat and/or end their life. Of course, those zoologists who work with the more lower evolved organisms like amoebas are dealing with beasts that have avoidance mechanisms pretty much along the same lines as plants, so collecting them can be just as onerous as it is for the botanists.
Hedging at This Step. Sending out a team of collectors to do the job for you. It works-and many
collectors in the 18th and 19th centuries did this (and some today use indigenous peoples who know their land and biota better than the adventurous collector to get the good stuff for them) but to truly understand your quarry, it is best for you to do the job yourself. Again, there are a few who do not or cannot leave the lab for vanous reasons physical or mental yet they do successfully complete the subsequent Steps in this process.

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NB: Some self-proclaimed "taxonomists" incredibly stop at this step However, this is abnormal

behavior, as most will be curious as heck as to what they collected, will fidget nervously, have sweaty palms, and will quickly move on to Step 3.

Step 3. Realizing and embracing the enjoyment of sorting species that have already been collected, whether
by you or others.

After completing Step 2, one takes the harvest back to the lab and dumps it out to be sorted and properly curated. This is the step of "discovery". The anticipation of finding something new is the drug that fuels the otherwise monotonous activity of sorting. For the collection of large vertebrates and many plants, the sorting may even take place in the field and it is merely the proper labeling and tagging and preservation that takes place in the lab. But for the invertebrate zoologist or other biologist dealing with droves of biodiversity, the sorting is delving into the unknown (whether it be a Malaise trap residue or a net full of marine invertebrates) and sorting and identifying the critters that one has collected.

Sorting can be quite a heady step to overcome and many taxonomists fail to get beyond this step. It is fraught with addiction. There HAS to be something NEW in this batch or the next batch... or the next ....!!!

If a taxonomist has an a priori hypothesis that unknown species X of genus Y MUST occur in a particular area and years and years of high-volume trapping such as with Malaise traps has taken place, there are known cases where that taxonomist has never come out of the lab to see daylight until that danged new species turns up. It may take years. And in some cases it has taken even longer.

Ways to Success. Aside from the anomalous taxonomist who likes nothing else than sorting through specimens in hopes of finding the new and unusual, this is an easy Step to complete for most. There are some who abhor the sorting process (see Hedging below) and would rather have someone else do the "dirty work"; but for the most part, the natural curiosity that drives most biologists allows one to easily complete Step 3.

Hedging at This Step. Having someone else do the sorting for you. This is true of many professors who have a large pool of students from which to tap to do this laborious chore of sifting through numerous uninteresting organisms in search of something worth screaming about. Granted, researchers and professors are often more highly paid than students, thus this can be a very cost-
moving through this step. It is not necessarily condoned by this author, but it is
efficient way of
understood that finances often dictate how a job is completed.

Problems at This Step. There is the mindset of some that sorting is the ultimate activity. There is always the goal in the back of that person's mind that if they find something new and unusual, they will be admired and adored by colleagues and may even get a patronym out of it. Thus, they are either always stuck here or at the next step.

Step 4. Realizing and embracing the enjoyment of the discovery of new or rare species from your efforts at
sorting.

Finding a new taxon can be a most rewarding experience and the thrill to some taxonomists is such that they cannot wait to put a name on it, describe it, and see their description in print. One would presume that the amount of the thrill would be proportional to the size of the organism discovered. Considering that the larger vertebrates are more well-known than their tinier invertebrate cousins, finding a new bird or mammal is indeed a rare and exciting event. Yet, the thrill is just as keen for

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the worker of the more abundant insects and other invertebrates. Even in the most biodiverse taxa of insects there is a thrill to finding something new-but it is usually not finding just one new taxon but a dozen or so at once that does the trick. Or else it is finding a new genus or family or

not previously described.
even order of animals or plant that can elicit an adrenaline rush rather than the find of a singleton
Ways to Success. The best way to blaze through this Step is to either have an incredible knowledge or not it is in fact new.
of all described taxa you are working on, or have good keys prepared that help you verify whether
Hedging at This Step. Probably the worst thing that one can imagine that is done at this Step is to exclaim that one has found a new taxon just merely to say they have found it when in fact they have not. I'm not talking about a find that is honestly thought to be new and subsequently found to be a junior synonym of something previously described. No, the worst case scenario here is the premeditated manufacture of something exclaimed to be new when it is not. It works best in taxa not studied again by anyone else for decades so that the fraud is not discovered until well after said taxonomist has left the earth. It unfortunately has happened.
Step 5. Realizing and embracing the enjoyment of researching taxonomic literature related to your new discovery.
Having all the literature of your taxon under study is essential to completing this Step. One cannot confidently say they have something new to describe if they do not have the original descriptions of related taxa or keys to those taxa to use for identification and comparisons. Combined with this is the oft-time necessity of examining types of related taxa to be sure your taxon is indeed something new to science.
Ways to Success. Having all this ready to go when you are at Step 4. Doing it here is the vetting process that assures you have a new taxon, but having the literature already at hand during Step 4 allows you to jump past this Step and on to Step 6.
Hedging at This Step. There really is no 100% successful hedge here. If you do not feel having the literature is necessary, you ultimately become vulnerable to a potential junior synonym. It's the gamble you pay.
Step 6. Realizing and embracing the enjoyment of describing and illustrating these new species.
This is the sit-down-and-describe-what-you-see (or, for the blind, feel) Step. Description and naming of
your new taxon is essential to disseminating and communicating with others what is out
there. An illustration is an added benefit to aid future researchers in identifying what you have described.
Ways to Success. To ease the "pain" of describing more than one taxon in a group with many new taxa, one can create a template description that only needs changes at various parts when the taxon being described differs from what is in your template. The advent of digital photography has made many illustrations unnecessary in some cases and has thus expedited the descriptive process.
Hedging at This Step. Describing the minimal amount of information to be legal according to each biological Code. For example, in zoology, one only needs to describe characters that differentiate one taxon from another. At a minimum, one could theoretically say "Yellow, 20 mm long" and that

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would validate the description and naming of a new taxon. Although of no real benefit to others as it does not convey all of the characters of the taxon being described, it has been done.
Step 7. Realizing and embracing the enjoyment of submitting your manuscript for publication of these new species and completing the publication process.
This critical Step is the final one that validates your description. Publication in a peer-reviewed journal is optimal. Review and certification by ones colleagues is the ultimate test of one's description
Ways to Success. There are many journals now that offer expedited publication yet still adhere to peer-review. Other journals that take a bit more time from manuscript to publication may offer benefits other than speed, such as free color, or the prestige of a being published in a high-impact jour-

nal.
Hedging at This Step. Self-publication. It speeds up the process but avoids necessary feedback from colleagues who might assist by letting you know that you are publishing something that has already been described. Also, tacking one's name onto a paper done primarily or worse, solely by someone else. It gives you unwarranted credit for doing taxonomy when you really haven't.
Step 8. Realizing and embracing the enjoyment of educating others to your new discoveries
Your publication being read by others is the primary education that is done at this step. But added value comes from every taxonomist who passes on information to others by educating them in any way possible to the uniqueness, wonder, or biodiversity of the groups that they work on.
Ways to Success. Give lectures to the public and make your publications available for free via pdf or online in some other form (subject to copyright of the publisher).
Hedging at This Step. Publishing in obscure journals or self-publishing and not making reprints available to others. This is done primarily by those who only want to see their name in print and really do not care about educating others in what they do or the organisms they study.
Summary
It is apparent that some taxonomists are as not as productive as others, and some, who may have published
early in their careers, just plain stop publishing or put their name on student's papers to keep their "name
alive". There are numerous legitimate reasons for this inactivity most having to do with squeezing their taxonomic research in between other obligations (administration, bioinformatics, phylogenetic analyses that
do not name new taxa, non-taxonomic research, teaching loads, travel, meetings, etc.). However, there are
some researchers that do not have any of these excuses, yet still are labeled as taxonomists and included
the number when we account for what expertise we have taxonomically in various areas. These "taxo- among
nomic deadbeats" are content to either collect, or sort, or both, but reluctant to sit down and crank out the writ-
ten results of their discovery of new taxa and give them names and publish them. Thus, they are not truly
taxonomists, but highly paid biological technicians, the latter who can essentially do those same tasks of col-
lecting and sorting but at a lower pay or for free. However, by not publishing the results of their discoveries,
biology as a whole loses out because of their not making public what they know is new. The quote at the
beginning of this article by Christopher Columbus scholar Mauricio Obregón says it best. Essentially, a dis-
covery is not a discovery until it is made public.
HELPING SOLVE THE "OTHER" TAXONOMIC IMPEDIMENT

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If we are to solve this taxonomic crisis, there are apparently two taxonomic impediments to overcome: 1)
to increase our base of taxonomic expertise to handle the biodiversity that exists yet to be described; and 2) to
get those already trained as taxonomists to get beyond Step 3 or 4 and publish their findings
I've outlined the steps that need to be taken. All that is necessary now to achieve what I term "Total

Enlightenment and Taxonomic Nirvana" is the discipline of each taxonomist to live up to their professional
label.

Acknowledgments

I thank Dan Bickel for numerous discussions on this topic as we worked together to successfully complete the
first two years of the Fiji project. An early iteration of the subject of this paper was prepared as a PowerPoint
presentation destined to be made public at the annual Entomological Collections Network meeting in Ft. Lau-
derdale, Florida in November 2005. Unfortunately, Hurricane Wilma caused enough damage to the conven-
tion center in Ft. Lauderdale and surrounding hotels to postpone the meeting one month, which resulted in a
no-show of this author and the presentation. However, the PowerPoint can still be downloaded from [http://
hbs bishopmuseum.org/fiji/ppt/nirvana.ppt]. Allen Allison, Tim New, Dan Polhemus, Jim Carlton, and Dan
Bickel are thanked for suggestions that helped improve the paper. The National Science Foundation is thanked
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remain solely those of the author.

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Issue #60 7/8
July/August 1996
MINNESOTA MUFON
Newsletter

From the State Director

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This month I will summarize Michael Strainic's presentation at last year's MUFON Symposium entitled Ufology in the Great White North. His interest in UFOs was aroused at age three when he saw photos of UFOs in a magazine. Strainic serves as National Director for Canada. He believes what we are seeing is not necessarily what we are getting. Too many incidents appear to be staged events, staged either by the phenomenon, or by the intelligence community. We have been looking at a rich variety of masks for decadcs, but probably have yet to see the real face behind the mask. His talk highlighted both historic and modern aspects of the UFO phenomenon in Canada.

The Airship Wave of the 1890s was documented both here and in Canada, with British Columbia having a large number of reports. At that time, a balloonist named Andre was attempting to balloon from Norway to the North Pole. Many sightings were assumed to be of the Andre balloon. But one newspaper made note that many reports of an object over north British Columbia could not have been Andre because accounts from Norway stated he had not yet be-

gun his journey - and was thinking of postponing it until the following year!

Some of the objects didn't really behave as expected of a balloon. One object was reported to have paused above a mountain peak, then made seven wide circles in the sky before finally speeding off in a straight course. Several sightings are described in detail, including one from which a shower of sparks seemed to drop like the sputtering of an arc light.

Airships were absent from Canadian skies from 1898 until 1908 when additional sightings were reported. In 1915, an object dropped three balls of fire into the St. Lawrence River. This event led the police to order a blackout of Ottawa Apparently believing that enemy aircraft were involved, marksmen were dispatched to the roofs of government buildings and ordered to shoot down any aircraft approaching the city. The expected invasion never took place and Ottawa citizens later laughed at this "scaroplane" scenario as a case of war nerves!

Students of UFO history know of a scientist named Wilbert Smith, who had been responsible for cogincering everything concerning the use of radio in Canada. He had an interest in UFOs and proposed to the Department of Transport to establish Project Magnet Smith believed that work in geomagnetics would be the link between our technology and that of the saucers. He wanted to study how magnetic and gravitational principles might account for UFO flight characteristics.

cont.

Minnesota MUFON
Meetings
Saturday, July 13
and
Saturday, August 10
Science Museum of MN

Computer Education Center
American Bank Bldg
101 E. 5th St., Suite 1900
19th Floor
SEE MAP ON COVER!
PARK FREE
Ramp Entrance is on
Minnesota St.
Proceed to 5th Level
Because this is a secured
building, to gain entrance you
must be at the ramp door
between 1:00 and 1:30 PM.
Someone will be on hand to
activate the elevator to take
you to the meeting room.
The next admittance time will
be at the 3:00 break.
Don't be Late!
The building and ramp areas are
designated as Non-smoking.
Coffee and soft drinks are
FREE!

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pens that Smith sent a memo
1950 to the Controller of Tele-
nunications proposing to offi-
cially study UFOs. In the memo, he
wrote that he had learned from Dr.
Robert Sarbacher in Washington DC
that the matter was the most highly
classified subject in the US govern-
ment; that their modus operandi was
being investigated by a small group
headed by Vannevar Bush, and UFOS
were considered by authorities to be of
tremendous significance. In 1953,
Smith filed a report which said, in
effect, that there should be a substan-
tial effort toward acquiring as much
as possible of this technology. Three
months later, a flying saucer sighting
station was operational ten miles from
Ottawa. A gamma ray counter, a
magnetometer, and gravimeter were
in place. In August, 1954, the gra-
vimeter recorded a disturbance, but no
visual confirmation was made. Two
days later. Project Magnet was shut
down. Several reasons were given, but

they did not include lack of results. Then Smuth began hosting meetings of an informal Flying Saucer Club. One night he took a break and went outside. A small spacecraft was hovering over the front lawn. For the next few years the ground beneath was scorched into sterility down four feet to bedrock. Smith's son later recalled that small spacecraft, monitor units, would perch in trees near their home. Leaves and branches would be scorched so that new leaves would not appear for a couple of years. They believed that the club was being monitored. [(New readers should understand that there has always been nonsensical and decepuve behaviors surrounding this phenomenon. The question may not be whether or not they were being monitored, but rather why the phenomenon wanted them to think they were. -Moss] Smith died in 1961.

The 1970s Fuhr case from Saskatchewan is well-known. Edwin Fuhr was swathing his field when he spotted five aluminum-colored domes spinning just above the ground. They rose into the air, assumed an echelon formation, emitted some smoke, and flew away. The swirled circles they left behind would be better described as "saucer nests," and not as crop circles.

Another high-strangeness event took place in Williams Lake, BC in 1990. A woman found a 39 foot ring pressed into her dirt driveway about one inch deep. Some of the rocks had been crushed and some had been driven flush into the ground. The ring was six inches wide. It was twelve feet from the house and had centered itself perfectly within the limited area of the yard. This had happened around 5:00 PM. Later, at 4:30 AM, a huge cone of red light was seen hovering over an apple tree in their son's yard next door. After about twenty minutes it left. The next day they found that every apple on the tree was gone! No apples were on the ground, no broken

twigs, and the tree had not been damaged.

Strainic told of several crop circle situations with accompanying phenomena. There were reports of dizziness and nausea when in the proximity of the circle. Dogs would bark excessively prior to the discovery of a formation. While investigating one formation, it was noted that Canadian geese were feeding in a field nearby. Various sized groups would leave the big flock and head for a destination that would have taken them directly over the formations. But they would always detour around the circle and continue on their course. Sometimes a small group would split up with some going to one side, and others to the opposite side of the formation, before joining up again. No goose ever flew over the formation. Odd sounds were also heard, such as that of a seemingly huge bird flapping its wings, or the sound of footsteps. But nothing was cver scen.

Canada also has its share of animal mutilations, sometimes with an odd twist such as internal organs that have bccn liquefied. A flattened porcupine was found in one crop circle. Its quills were arranged in a way that suggested they had been swirled by the same force that had affected the wheat. Quills and wheat were intertwined. A porcupine can weigh as much as sixty pounds, so the force that flattened it down to a one-to-three inch thickness must have been considerable.

In another case, a farmer's blind Blue Healer dog had disappeared in August and was found in October near a circle in a flax field. The dog's head was missing and later found about 200 feet north of the body. Strainic said that flax is very dense and difficult to walk into, yet this blind dog had walked a quarter mile into it. This circle was part of a group of six circles located close to the house. All were only ten feet across. Nothing had been seen or heard.

Finally, there is the Shag Harbour,

Nova Scotia case of 1967. At 11:00 PM on October 4, a sixty-foot diameter UFO was seen hovering over the water near this fishing village. It then dropped rapidly and hit the water producing a bright flash and explosive roar. Witnesses called the RCMP office, thinking a plane had ditched into the harbor. When they arrived, the object was still on the water. It was glowing yellow and producing a yellow foam. Then the object went under. The sulfur-smelling yellow foam continued to well up from the point where the UFO sank and a slick developed. Seven Navy divers searched during daylight hours. Five days later the search was canceled.
5 always, the full text of the
that
is not summarized here. Consult a copy of the 1995 MUFON Proceedings for Michael Stainic's full account.
Dick Moss

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Minnesota MUFON
e UFO Phenomenon
nd The Scientific
Method
D
by Craig R. Lang
uring a recent discussion with another MUFON member the question arose of "what exactly is science?". In the context of the UFO phenomenon and related anomalies, the concept of "science" is not always well understood. Thus, in my view, this question is one which cuts to the core of UFO investigation. Science is just one discipline which attempts to deal with the UFO phenomenon. Other areas, such as the new age movement, spirituality etc. have their own sets of rules and beliefs. While I do not wish to dispute their beliefs, I suggest that we need to clearly distinguish between the discipline of science and any other approaches.

I suggest that overall, conservatism in science is good. The burden of proof is upon us.

Science has the criteria that it deals strictly with assertions that can be verified by experiment. To overcome the "giggle factor," UFO research must conform to this criterion, perhaps even more closely than other more established areas of science. This article addresses some of these areas and looks at how UFO research can (and often does) use the practice of "good science" to discover the truth behind the mystery.

How is Science Done?

The Scientific Method

First of all, what is science? Fundamentally, science is a formalized process for discovering the nature of the world around us. It is based upon the idea that the nature of the world can be understood using rational, systematic inquiry. By reasoning, observation, and experimentation, we can construct - then validate a model of reality that closely approximates the real world.

By definition, a scientific investigation is one which follows the scientific method. This method is described in several different ways, depending upon which text one reads. For instance, in the Bear, Connors and Paradiso, text, "NeuroScience," the scientific method is described as consisting of the following components:

Observation: Data is gathered about a phenomenon by exper-iment, field obscrvations, etc.

Replication: The observation must be reproducible to verify that it was done correctly and to show that there are not other possible factors accounting for the data.

Interpretation: Data from the observations is interpreted in the context of current knowledge (or

lack thereof...). The hypothesis may be confirmed, revised or disproved based upon the data. (Note: This is the one step of science which is the most vulnerable to human failings.)
Verification: Other experiments which may or may not be similar can be performed to confirm or revise the hypothesis. This is the all-important step distinguishing science from other fields. All experimental results must confirm the theory, or the theory must be revised.
Another view of the scientific method is described in W.I.B. Beveridge, "The Art of Scientific Investigation". In this view, scientific investigation is a progression, based on observation and experiment, from initial observation, to hypothesis, to theory, to law of nature. Scientific investigations generally follow this progression, often over many years. or even many lifetimes, and often backtracking in the face of new evidence.
A scientific investigation usually begins with initial observations or experiments, which are interpreted to develop one or more theories of the phenomenon in question. A testable hypothesis is developed, which can be verified by an experiment. The hall-mark of a good hypothesis is that it can be used to derive a prediction. It is best when multiple hypotheses are developed making differing predictions which can then be confirmed or refuted by experiment. An experiment, or other means of observation, is then performed. The analysis of the results cither confirms or disproves the predictions of the hypothesis (or sometimes results in a surprise). Conclusions from inter-pretation of the results usually suggest further tests of the theory giving rise to the hypothesis. Usually verification of a theory is the result of a series of experiments. Conclusions are re-

verified by still more experiments, ad infinitum.

Science, Politics and the Mainstream

By nature, science is conservative. For every new assertion there will always be skeptics who demand compelling evidence. This has the advantage of preventing "erroneous science" from making it into the mainstream, but it has obvious disadvantages for the studies of UFOs. Still, I suggest that overall, conservatism in science is good. The burden of proof is upon us. Unfortunately, scientists are human and are subject to human failings. Few, scientists included, are willing to casily give up a comfortable world view even in the face of solid evidence. It is often casier to overlook the new evidence - even if it is

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g. Thus, data at variance to prevailing view is unfortunately Sometimes rejected for other-than-scientific reasons. This is a problem that anomaly researchers will always have to face. At present, probably the best that we can do is to conform strictly to the scientific method, offer compelling evidence, and let a gradual paradigm shift take its course.

Applications to UFO Studies

UFOs, by nature, do not lend themselves to laboratory experiments. Therefore, we have to settle for field observations during sightings. This means that the key difficulty in UFO studies is the inability to reproduce results a fundamental requirement in understanding any phenomenon. However, the problem is no different for UFO researchers than it is for those studying earthquakes, weather, or other sporadic phenomena. We "mcrely" require a reliable means of recording the phenomena whenever it occurs, for later analysis.

Skeptics require compelling

evidence and I feel that the "smoking gun" does not yet exist to explain the UFO phenomenon. Still, events such as radar/visual cases, ground traces and multiple witness sightings have provided evidence- - often quite convincing. While this is encouraging, to me the evidence remains ambiguous.

A key to understanding and verifying the phenomenon will probably lie in rigorous and extensive data-gathering, such as is increasingly being done by UFO research organizations (MUFON, CUFOS, etc.) From this, there are possibilitics for statistical analysis of sightings data. analysis of ground traces and artifacts, etc. Objective "experiments" such as instrumented skywatches (such as those in Gulf Breeze, Florida) using formalized procedures should also be considered.

By analyzing the data we can draw general conclusions about UFOs such as size and shape distributions, flight dynamics, descriptions of entities, etc. We can characterize the general behavior of UFOs (and their presumed occupants). We can then use this characterization to form hypotheses which hopefully, we can find some way to verify.

After many years of research, we are still only acquiring and analyzing initial data. The field of UFO studies is still just beginning to form hypotheses of explanation. At present several theories exist to explain the UFO phenomenon: The nuts-and-bolts ET hypothesis, spiritual and inter-dimensional interpretations and more skeptical views. However, at this stage, it does not seem to me that any of these ideas are verifiable. I suspect that eventually a testable hypothesis will be confirmed by a combination of observation and compelling physical cvidence. But we have a long way to go and a lot of science to do before this phenomenon is accepted as scientific reality.

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Craig Lang
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Field Investigator Group Update

by Craig R. Lang

ver the last couple of months, wc

Over the last couple of mnog upsurge of people interested in doing field investigator work. Since this is one of the primary reasons for the existence of MUFON, we want to encourage this as much as possible. We have just begun the process of training a new group of investigators (myself included), and setting up an investigator network.

An interest sheet has been posted at the last Minnesota MUFON meetings. If you are interested in field investigator training, or would like to help set up our field investigator network, please sign up on this sheet at the next meeting, or contact:

Craig Lang,
[AD] Home: 612-560-1532,
[AD] Work: :612-572-5035,
e-mail:
craig.lang@medtronic.com

Field Investigator Study Group

The first step is to get as many people as possible to pass the MUFON Field Investigator's exam. To that end we have set up a field investigator study group. We plan to meet in June and July on the dates of Wednesday June 12, June 26, July 10 and July 24. The meetings will be at Craig Lang's house at 7:00 PM.

We currently have six people signed up for this group.

Since we all have diverse schedules,

and live in diverse locations, there will be some people who will be unable to attend the sessions we have set up. For those people, a second study group can probably be organized (as of this writing one may

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but I am unaware of it).
me if you are interested.
Tentatively, we envision going through the 100 question field investigators exam, looking at approximately 25 questions each session. In addition we can look at pertinent aspects of the mamial, or other related literature as needed. We are always open for suggestions/ideas.
Everyone attending the group should have a copy of the MUFON field investigators manual ■ and should read it. You'll also need a copy of the test. Call Jocl Henry at [AD] 431-2426 or Tim Watts at 985-5747, or contact me if you need a copy.
Organizing the Network
This is the hard part. Work is just beginning in this area and we are open to suggestions. In my vicw, the prime need is to establish a cadre of available field investigators, and to develop close ties with law cr forcement authorities and the local/regional press. Kathi Hilton has begun to work on this aspect of the effort. For more details, or if you'd like to volunteer your assistance, Contact her at
[AD] 612)484-6492,
E-mail: kathi.ts@ix.netcom.com);
[AD] or Dick Moss at 612-732-3205
[AD] or me at 612-560-1532.
Setting up the network should be our next priority. Our end result should be a group of trained, cre-dentialed investigators, along with a means of rapidly alerting them to current sightings.
Happy Investigating!
Minnesota MUFON
UFOs in Elementary School? You bet!

"How much is $1 billion?" asks Bob Schultz. The 14 fifth graders react loudly when he pulls a stack of 100 $1 bills out of his briefcase.

He asks one student to measure the stack's height, and then proceeds to take the class step-by-step through the necessary mathematics to reach the conclusion that a stack of 1 billion $1 bills would be 78 miles high.

"Half the way from here to Duluth," says Schultz.

Billion-dollar budgets, spy rockets, alien saucers, men on the moon. These are just some of the topics Schultz covers during his 10-week mini-course at Pike Lake Elementary,. "The science, politics and history of UFOs." Ron Sweeley, a fifth grade teacher at the school, encouraged Schultz to teach the class on a volunteer basis.

Schultz's class about UFOs has generated substantial interest among the fifth graders. Because of limited space, only the first 14 of the 60 students applying for the class were admitted this spring.

Schultz taught the first UFO class last fall. Because it is an unusual subject matter for young students, he requested that parents attend with their children. In some ways, this made the first class more productive because it stimulated discussions at home about the topic.

"One parent came up to me in a store and told me that her daughter guarantees that she's going to be an astronaut, and that she's bought the telescope and is doing ground training because the class captured her imagination."

In fact, current students are so intrigued they would like to start a UFO club. Schultz, a retired electrical engineer, says this is exactly why he became a volunteer in the schools.

"I tell kids to not just believe everything I say, but rather, do their own research. I always say to them. that they have three choices: to believe, not to believe, or think maybe.

With the help of magazine articles. simple science experiments and videotapes, Schultz talks about the science of flight, chemistry, physics, astronomy and mathematics.

"I want to teach them that science is a neat thing," he says. "That there's a lot more out there than you know about. I want to encourage them to strike out on their own."

By exposing the students to some of the complexities of science now-such as velocity formulas and the theories behind anti-gravity flight - Schultz says he hopes they are not intimidated by it in the future.

Actually, I can't believe all the stuff they get," he says. "The kids will surprise me. Last week, three students came to class with library books on related topics that they had looked up and found."

Bob has been asked to add a second class in the fall of this year. Needless to say, he's thrilled that the class is drawing so much positive attention, and who knows... He may be responsible for a whole new crop of budding field investigators! Well done, Bob!

Wes Crum

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MINNESOTA MUFON

Remote Viewing and Cosmic Voyage

T

by William I. McNeff

The validity of remote viewing, cspecially "Scientific Remote Viewing"(SRV) as described in the book, Cosmic Voyage-A Scientific Discovery of Extraterrestrials Visiting Earth, by Courtney Brown, Ph.D., is potentially of great impor-Lance. If SRV does not work, or does not work anything like as well as Brown says it does, then the book is worthless, and the ufological and scientific communities have lost a potentially useful tool. Therefore, 1 have expended some efforts to evaluate the validity of remote view-

ing, and SRV in particular, which includes reading the latest Journal of Scientific Exploration.

First, I would like to recount my personal experience with what I believe to have been a form of remote vicwing (RV). Those who have studied RV have found evidence that it works going either forward or backward in time. Quoting from my diary of Tuesday, August 7, 1984; "...[early] this morning...I had a vivid dream. My mother was...in the living room in the old house on the hill" (the family farm in Nebraska). In my dream, my mother was sitting in a chair, when she slid out of the chair and to the floor so that her feet were touching or entangled with the pedals on the piano. This dream was so vivid that "7 awoke and checked the time, because I wondered if my mother had actually died and this was a message. I sold my dream to Larry (a friend at Control Data) this morning, and he was alarmed by it. He told me of a precognitive dream or vision which he had several years ago... Early one morning, he awoke crying and said Mr. G. (a friend who lived nearby) is going to die of cancer!' His wife witnessed this. Later in the day, she phoned to say that Mr. G. had taken sick suddenly and had been taken to the hospital. Within two or three days hc died, from abdominal cancer.

He (Larry) also told of a vision of a friend of his, lying in a bed in a white nightgown in a room furnished only with a night stand. A phone call to his friend confirmed this: the room had been emptied for re-decorating.

The next entry in my diary is for August 9, Thursday: "My father phoned this morning and told us that Mark (my nephew) had been killed in a tractor accident. Another nephew, Ken, had been driving the tractor, packing the silo...after dark. Mark had stopped on his way home from his job (to see Ken, and was riding on the tractor with Ken). (The silo was on above -the-ground type with

concrete walls about 15 feet high.) The tractor [slipped sideways and] fell off the wall and killed Mark instantly. Ken is injured."

Those who have studied dreams tell us that much of what we see in our dreams is symbolic. I believe the accident that my mother had in my dream was symbolic of a family tragedy -the loss of a child- because she had already experienced such a loss

a daughter had been stillborn.

It has been theorized that the emotion from such an event can cause a harbinger of the event to project backwards in time. There were elements in the dream that corresponded to clements in the accident: the chair (tractor seat); a fall, and pedals (the clutch and brake pedals on the tractor). Of course, I may be reading loo much into those elements, but it is clear to me that Larry and I recognized the dream as having to do with death. These three incidents, along with others, pretty well convinced me that remote viewing is a reality.

arly last fall the CIA announced panel to review experiments in remote viewing that it had sponsored. I now quote from the Journal for Scientific Exploration, Vol 10, No. 1:

The extent of government-funded psychic remote viewing research has been a long-standing topic of speculation. The declassification and release of a 270 page SRI report (out of an estimated 80,000 pages of program documents that remain classified) and the commissioning of a relrospective review of these programs...finally resulted in at least partial public disclosure of these 24-year long efforts that took place at SRI (1972–1990) and later at SAIC [AD] (1990-1995). The outcome of the CIA-sponsored review was unusual in that two reports were issued one by Prof. Jessica Utts, a statistician at the University of California, Davis, and one by Prof. Ray Hyman, a psychologist at the University of Oregon

- which came to opposite conclusions concerning the underlying reality of so-called psy phenomena. We also note that the director of the SAIC effort, Dr. Edwin May, has raised serious criticismis concerning limitations on information made available to or allowed to be used by Utts and Hyman by the CIA.

Now, really! Are we to believe that the CIA sponsored this research for 24 years with only negative results the whole time? If true, this would call into question the judgment of the CIA program managers. The articles in the JSE make it plain that the program had some remarkable successes. For example, in an article by Harold Puthoff (p.75):

"With regard to admission by the government of its use of remote views under operational conditions, officials have on occasion been relatively forthcoming. President Carter, in a speech to college students in Atlanta in September 1995, is quoted

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by Reuters as saying that during his administration a plane went down in Zaire, and a meticulous sweep of the African terrain by American spy satellites failed to locate any sign of the wreckage...The head of the CIA turned to a woman reputed to have psychic powers. She gave some latitude and longitude figures. We focused our satellite cameras on that point and the plane was there.

Per the JSE, a recently unclassified report (Mumford, et al., 1995), concerning a remote viewing prograni called Star Gate, cites the role of the CIA and DIA in the program, including acknowledgment that a cadre of full-time govemment employees used remote viewing techniques to respond to tasking from operational military organizations.

Another startling success for remote vicwing (JSE, p.87) concerned

a Soviet complex, apparently concerned with research on beam weapons. Viewer Pat Price sketched a giant gantry cranc at this site, getting the number of wheels (cight) correct as well as the general shape, and describing a huge steel sphere being welded together in sections inside the building out of view of spy satcllites. This was not known to the US until two years after Price's death. Price had the diameter of this 60 foot sphere correct to within 18 inches.

But in spite of all the successes, there were political reasons that the CIA did not want the responsibility for the remote viewing research when asked by the DIA. They had just had a huge operational and public relations failure in the Alrich Ames scandal. Also, it appears that the CIA was and still is secretly using remote viewing. By publicly pooh-poohing remote viewing, the CIA could attempt to prevent knowledge of the program by potential adversaries, while still being able to us RV for intelligence purposes. Finally, the research
program was badly mismanaged and made ineffective under the DIA, for reasons too complex to go into here. (Sec JSE, p 105)

The CIA "stacked the deck" for their "scientific" evaluation panel. In his report, Ray Hyman says "Our evaluation will focus on the ten experiments conducted at SAIC." This is the typical procedure of excluding data which might prove exactly the opposite of what you want to "prove." The ten experiments were a set that had a low rate of success, compared to those performed earlier over a pcriod of years at SRI. But even evaluating these ten, Prof. Utts stated: "Using the standard applied to any other area of science, il is concluded that psychic functioning has been well established."

Prof. Utts also stated: "I am clueless as to why Ray Hyman is making claims in the media that we had ac-

cess to the operational work for our review. I do not think he was given access to any information not shown to me." Of course, all researchers on the panel should have been given access to the same information.

Perhaps the most interesting statement in the JSE about remote viewing was made by Russell Targ, one of the main SRI researchcrs: "...it is my belief that the remote viewing data has made a significant contribution to our knowledge of our relationship to a non-local universe in which we are interconnected and increasingly interdependent. It is my hope that our awareness of this interconnectedness...will also promote greater compassion among all people." It is a statement that could be taken several ways.

WIM
MOVIE
REVIEW
by Todd Amundson

The Arrival

harlie Sheen plays a radio astronomer scarching for intelligent signals from om space.

As scientist, Zack Zabrinski, he is known for his creative ideas. When he decides to search the FM band, violating SETI protocols, he finds his message, but when he reports the exciting news to his boss, he loses his job under the guise of "company downsizing." No one will hire him so he takes matters into his own hands, borrowing neighborhood satellite TV dishes for his own program to verify the original signal, and somehow get the news in the hands of the public. He runs into some rather astounding problems in the form of aliens who are able to morph themselves into humanoids.

Overall, "The Arrival" is an action film with science fiction overtones, reminiscent of the paranoid thrillers of the cold war years. The creature design is very good, making the aliens both unusual and believable. The

special effects enhance the story, rather than overpowering it. There is a silly subplot involving a climatologist studying global warming, but in total, this is an enjoyable film. See this one now, and compare it with "Independence Day" later this summer.
MIT
ADMIT
*ONE

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MINNESOTA MUFON
Moon Shots and Ghost Astronauts:
Did Deke Slayton Take His Last Flight After Dying?
by Loyd Auerbach and Martin Caidin
The following is reprinted from the Internet with the authors' permission. In checking out this amazing account. I spoke with Deke
Slayton's wife, Bobbie Slayton, a Houston resident (and Houston Sky reader). to see whether she would deny the story. To my surprise, she confirmed almost all of it, saying that the FAA citation is still in her possession. - Houston Sky Editor
The late, great, world-famed astronant Deke Slayton co-authored the book Moon Shot, adapted as a two-part special for Turner Broadcasting Systems (TBS) July 11 and 13, 1994. Slayton, during his life, was a crew member of the 1975 US-USSR Apollo-Soyuz mission, one of the original Mercury Seven astronauts, former test pilot with the USAF, and an avid racing plane pilot. He died at his home in Texas at 3:22 a.m., June 13, 1993. With him were his wife, Bobbie, and their daughter, Stacey.
But, as shown at the end of the second part of the TBS adaptation, that was not the last time Deke Slayton made his mark on this planet. Slayton's final flight took place hours after he died.
Later the same day he died (June 13, 1993), at 7:57 a.m. local time, at John Wayne Airport in southern California, a Formula One racing plane with large FAA required registration letters and numbers on the fuselage, N21X, took off from the airport and performed

various flight maneuvers.
With a high-speed propeller, the extremely noisy aircraft was seen and heard by many people, who clearly identified the type of aircraft and wrote down the N21X registration. The Federal Aviation Administration determuned that a noise level mandated by law had been exceeded, and issued a letter of citation against the registered owner and pilot.
On July 20, Bobbie Slayton received a letter in the mail dated June 28, 1993, from the FAA to Donald K. Slayton, notifying him that he was being cited for violating FAA regulations. The letter had been sent to a condo at which the Slaytons sometimes stayed, and its delivery was delayed until Mrs. Slayton picked up the mail.
Upon receipt of the letter, Bobbie Slayton telephoned the FAA and inquired if they had all gone crazy pointing out that Deke Slayton had been dead for six hours before the reported incident in Orange County.
She further added that this particular racing plane, N21X, had been in an aircraft muscum in Sparks, Nevada (located northeast of San Francisco), since March 1993- and that before being placed in the museum, the engine had been removed from the aircraft and was still in the museum, next to the plane!
To save weight, the plane Slayton had flown had no electrical starter, and the engine could be started only by a person outside the plane who would swing the propeller while the pilot worked the controls inside. The plane sighted at the airport, however, had taken off on its own.
So how could the plane have been there... hours after Slayton died, when the plane, minus an engine, [was] in an aircraft museum?
Bobbie Slayton remarked that the reason for the delay Deke took beforc getting into the air in his racing plane was that "he probably took six hours to find Gus" (Grissam, his best friend, who died in the Apollo I fire on Pad 34

at Cape Canaveral] "to prop the plane for him.

Witnesses at the airport who were questioned first by the local authorities, and then by pilots talking to other pilots, and then by still more pilots and investigators sent to Santa Ana for further confirmation, all agreed that the airplane taking off the morning of June 13, 1993, was not only clearly identified as N21X, but that this particular airplane, which had flown for years with this federal registration, was an all-red Formula One racing aircraft, that it departed from the airport in Orange County, flew through various maneuvers in the area, and then flew off in a steady gradual climb on a westerly heading -and was never seen again. Martin Caidin, paranormal investigator, series advisor for Moon Shot, expert on aviation and manned and unmanned space shots, and author of the books Ghosts of the Air and Natural or Supernatural? has quoted Slayton as saying: "No matter what happens, no matter how rough it gets, no matter how impossible it becomes - always keep the dream alive.

According to Bobbie Slayton, the day after the incident, she phoned the Nevada museum to ask whether the plane was still there. The person with whom she spoke assured her that it was and had never been gonc.

-Houston Sky Editor

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De Bestiis Marinis, or, The Beasts of the
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De Beutlis Murinis

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But all sea animals have something, either in appearance or in habits, in common with land animals, on account of which even at first sight they are compared by the common people to these animals, and thus get their names. So the host of natural philosophers talk about bulls, horses, wolves, and, dreaming of allegories, bring in monks and other men. It has seemed to me worth mentioning that Ruthenian sailors when they first saw the manatee called it "Korova Morskaia," (■■■■■■ M■■■■■■) with exactly the same propriety as the English and Dutch called it a "sea-cow;" "Sivutcha" (■■■■■a) they called "sea-lion," and "Kot' (Ko■■■) "sea-bear." Not noticing the criteria offered by nature, they less appropriately called the "sea-otter" "Bobr Morskoi" (■■■■■ ■■■■■■■). But all these animals became known only half a century ago; in fact, Marcgraf makes mention of the sea otter, but somewhat briefly and obscurely. The navigator Dampier, a tireless explorer, speaks of the sea lion and the sea bear; and many learned men, and Dampier as well, mention the manatee. But I must admit that the accounts given by the scholars are fragmentary and imperfect and for the most part fabulous and false. Dampier, on the other hand, has by many parasangs excelled them with a most accurate description, as good as could be expected from an unlearned man.

But one must not suppose that these places do not contain more great and wonderful animals that are still unknown, besides those which I shall describe. For if weather, time, and place had favored my desire I should have enriched natural history with many curiosities of that sort, as indeed I desired when I took the risk of this journey to parts so distant and unexplored. Thus, for instance, I describe the traces of a certain unknown animal upon the island of Shumagin, and I insert a sketch of a sea ape, and with this imperfect account I must content myself and others.

parasang: ancient Persian unit of distance, estimated at 3.5 miles.

In what order I shall next year examine the shores of the sea near the mouth of the river Kolima time will tell. My zeal is fired by those mammoth skeletons and the slight accounts of them. And I do not doubt that the American shores are to become better known to us, and with them this wonderful subject as well. As long as things escape us and perish unknown with our consent, and through our silence are counted as fabulous things which may be seen with little labor in the very land where we, with all our inquisitiveness, live - it is not strange that these things, which we are prevented from observing by the great sea that lies between, have remained to the present time unknown and unexplored. In the farther confines of Asia and the Russian Empire I learned that the "Suhac" of the Scythians was regarded as fabulous. I also learned that in the Desert of Azof, and in that where the Saporozkiensian Cossacks live, the one-horned goat bears the same name - an animal very common and very well known upon their tables. There is

likewise a Scythian wolf, black in color, and described by Aristotle as longer than the common wolf but with shorter legs, exceedingly fierce and savage. There is also in the neighborhood of Voronesch and Astracan an animal that barks like a dog. It is sly and bloodthirsty and will attack people lying asleep or steal whatever it can from the household stores. This maybe the hyena of ancient times. And I desire nothing more than that, after I have explored Siberia, the authorities may think well to intrust to me the exploration of the deserts provided no one else undertakes it; and I hope that if my efforts prove acceptable I may be sent into exile for several years on their account, that I may spend there a long time, which I prophesy will prove but too brief.

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DE BESTIIS MARINIS
THE MANATEE
14
THE MANATEE
The following is a description of the manatee, or, as it is called by the Dutch, Vacca marina (sea cow), by the English, "sea cow," and by the Russians, "Morskaia Korova;" the description is made from a female killed on the 12th of July, 1742, on Bering Island, which lies in the channel between America and Asia. It had, according to the English scale of measurement, the following dimensions:

Length from the extremity of the upper lip to the extreme right cornu of the caudal fork	Inches, tenths
Circumference of the head at the eyes	48 O
Circumference of the neck at the nape (nucham)	82 0
Height of the end of the snout	84
Circumference of the body at the shoulders	144 O
The greatest circumference about the middle of the abdomen	244 0
The circumference of the tail at the origin (insertio) of the fin	56 O
Distance between the extreme points of the caudal fin (this is the breadth of the fin)	78 0
	88
Height of the fin	
From the extremity of the upper lip to the nares	----
From the narial septum (columna narium) to the anterior	

296 0
80
The whole length of the inner lip, which is villous
and rough, like a brush---
52
Width of the same
25
eye
Distance between the eyes at the posterior angles
angle of the
From the anterior angle to the posterior angle of the eye
Distance between the eyes at the anterior angles
The width of the exterior upper lip, which stands
13 5
17 4
Height of the same
22 2
The breadth of the narial septum (columna narium)
at its base
1 5
obliquely to the lower jaw and is covered all over
with rather long, white bristles
The breadth of the lower lip, which is hairless, black,
smooth, and slopes toward the sternum, and is
heart-shaped
14 O
10 0
Height of the nares
25
Height of the same
Breadth of the nares
25
From the extremity of the upper lip to the angle of the
mouth (oris froenum)
15 5
From the extremity of the upper lip to the shoulder
52 0
From the extremity of the upper lip to the opening
of the vulva
194 0
Length of the vulva
10 2
Length of the tail from the anal sphincter to the
From the lower lip to the sternum
The diameter of the mouth at the angle (oris froenum)
From the pharynx to the end of the oesophagus
The width, or rather length, of the stomach
The whole intestinal tract, from pharynx to anus
And so it is 20½ times as long as the whole animal.
From pudenda to anal sphincter
Diameter of the trachea below the glottis
74
6 8

54 O
20 4
32 0
44 O
-5,968 O
region of the caudal fin
75 5
Height of the heart
80
42
22 0
25 0
Circumference of the head above the
Width of the heart
nostrils (supra nares)
31 0
Length of the kidneys
32 0

[PAGE BREAK]

15
Width of the kidneys
Length of the tongue
DE BESTIIS MARINIS
Inches, tenths
18 O
12 O
25
4 O
14 5
Length of the ulna
12 2
Length of the skull from nares to occiput
27 O
Width of the occiput
10 5
Width of the tongue
Length of the nipples
Width of the humerus
Description of the External Parts
This animal belongs practically to the sea, and is not amphibious, although some authorities have so narrated; but they have misunderstood the stories of some others who tell of its feeding upon vegetation about the shores of the sea and rivers. But by this was meant not the vegetation of the land, but seaweed that grows out in the water on the shore of the sea. This seemed quite an unwelcome fact (that it fed on seaweed) and most absurd to Celsius Clusius, who had seen a whole hide stuffed with straw; but it is found to be so also in the case of the living beast (strange as it is true), if one will but have regard to its form, movements, and habits.
It is covered with a thick hide, more like unto the bark of an

ancient oak than unto the skin of an animal; the manatee's hide is black, mangy, wrinkled, rough, hard, and tough; it is void of hairs, and almost impervious to an ax or to the point of a hook. It is an inch thick, and a transverse section of it is very like unto ebony both in smoothness and in color. This exterior cortex, however, is not skin (cutis), but cuticle (cuticula); but in the dorsal region it is smooth. From the nape to the caudal fin the surface is uneven with nothing but circular wrinkles, but the sides are exceedingly rough, especially about the head, and bristling

with many cup-shaped prominences like stemless mushrooms (pezicas). This cuticle which surrounds the whole body like a crust is frequently an inch in thickness; and it is composed of nothing but tubules, in the same way as we observe in the Spanish cane or Mambu of the Indians and Chinese (ac in arundine videmus Hispanicove Mambu Indorum et Sinensium). The structure of these tubules is perpendicular to the skin. Longitudinally they can not be torn or separated from one another. The tubules are implanted in the lower part of the skin; they are roundish, convex, bulbous, and hence pieces of the skin that are torn off from the cuticle are full of tubercles like Spanish bark, and the underlying cutis is excavated with a great many very small holes, like a thimble (netricum digitale), which were before the receptacles of the bulbous tubules of the cuticle. Now, these tubules rest upon one another very closely; they are tenacious, wet, and tumid, and they do not appear when the cuticle is cut horizontally, but the surface is smooth, as the hoofs of certain animals when they are cut. But as soon as it is hung up in pieces and exposed to the sun and becomes dry, it has perpendicular fissures and can be broken like bark, and then this tubulous structure comes clearly to view. Through these tubes a thin, serous mucus is exuded, in larger quantities on the sides and about the head, and in smaller quantities on the back. When the animal has lain for some hours upon the dry shore, the back becomes dry, but the head and sides are always wet.

Now, this thick cuticle seems given to the animal for two purposes principally: (1) That, inasmuch as the animal is compelled, for the sake of getting a living, to live continuously in rough and rugged places, and in the winter among the ice, it may not rub off the skin, or that it may not be beaten by the heavy waves and bruised with the stones, and when pursued it is protected by this coat of mail; (2) that the natural heat may not be dissipated in the summer by too profuse perspiration (nimium transpirando), or completely counteracted by the cold of

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winter. And that would be natural, for it has to live, not in the depths of the sea as other animals and fishes, but it is always compelled in feeding to expose half of its body to the cold.

I have observed in the case of many that were cast up dead upon the shore of the sea, that the cuticle had been broken off on one side or the other, and that that had been the cause of their death; and this happens principally in the winter time, from the ice.

And I observed many times in animals that had been captured and drawn on shore with a hook, that great pieces of cuticle had been pulled off in consequence of the violent thrashing of its body and tail and its resisting with its front feet, and that the broken piece of cuticle that covered the arms and caudal fin was like a hoof; all this goes to make my opinion stronger. Cuticle of exactly the same sort covers the whale (balaena), although no mention is made of it by the authorities; and almost the washed up dead

whole of the cuticle was rubbed off from a whale that was upon our island on the 1st day of August, for

during several days it had been tossed about by the waves, this shore.

way and that, and bruised upon the rocks before it came to our

While this cuticle is wet it is tawny black, like the skin of a smoked ham, but when it is dry it is wholly black. In certain animals it is marked with rather large white spots and zones, and this color penetrates clear to the cutis. This cuticle about the head, eyes, ears, breasts, and under the arms, where it is rough, is thickly infested by insects, and it frequently happens that they perforate the cuticle and wound even the cutis itself. When this happens, large, thick, warty prominences arise from the lymph of the cutis, or from the broken glands that preserve the oil, as it were, in the little cells, in the same manner as in whales, and oftentimes make the above-mentioned places foul.

Under the cuticle lies the cutis surrounding the whole body. This is 2 lines thick, soft, white, very firm in strength and struc-

ture just like that of the whale, and it can be put to the same uses.

In comparison with the huge mass of the rest of its body the head is small, short, and closely connected with the body; in figure it is a square oblong, widening from the top toward the lower jaw. The top itself is flat and covered with a black cuticle, exceedingly scraggly and a third part thinner than the rest of the cuticle and more easily torn off. The head slopes from the occiput to the nares and slopes again from the nares to the lips. The end of the snout is 8 inches high and grows rapidly thicker from the nose to the occiput.

The opening of the mouth (rictus oris) is not underneath (supinus), but in a line with the sides; but the exterior upper lip is so large, broad, and oblique to the angle of the mouth, and lengthened out so much above the inferior mandible, that to one who looks at the head alone the opening seems to be located underneath.

The opening of the month itself is not very large in proportion to the animal, nor is it necessary that it should be, as it

lives on seaweed.
The lips, both the upper and the lower, are double and divided into external and internal lips.
The external upper lip, finishing the end of the snout obliquely, is like a half circle; it is flat, tumid, thick, 14 inches broad, 10 inches high, in color a glossy white, and overgrown with a great many little hills or tubercles, from the center of each one of which grows a white, translucent bristle 4 or 5 inches long.
The internal upper lip is 5 inches long and 2½ inches wide. It is everywhere detached from the external lip, and fastened to it only at the base; it overhangs the palate, and it looks like a calf's tongue, all villous and rough like a brush. It closes the mouth firmly above; it is movable, and by its own motion serves to tear off the seaweed and bring it into its mouth; for it feeds in

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the same way as horses and cattle, by protruding its lips and bending them outward.
The lower lip is likewise double; the external lip is black, and smooth, and without bristles; it is roughly heart-shaped and like a chin, if we may so call it; it is 7 inches wide and 6.8 inches high.
The internal lower lip is separated likewise from the external; it is villous and is not visible when the mouth is closed, because the external lip reaches out and covers it; and being set opposite the internal upper lip it closes the mouth firmly.
When the lower mandible is applied to the upper, the space which intervenes when both are closed is filled up with a dense array of very thick white bristles 1½ inches long. These bristles prevent anything from falling out of the mouth while the animal masticates, or from being washed out with water which flows into the mouth and is driven out again through the opening when the mouth is closed.
The bristles are as thick as a dove's quill; they are white, hollow inside, bulbous below, and, even without the aid of a microscope, they show clearly the structure of the human hair.
If the animal lies prone upon its belly, the end of its snout on a line perpendicular from the nares to the lips is 8 inches high and is rounded in front, like a ball, from the nose to the ends of the lips and also to the lateral regions of the upper jaw. It grows thicker and increases rapidly in circumference. The external lips are very prominent, thick and swollen, and perforated with a great many large pores, like a cat's, from each one of which grows a strong white bristle; these bristles are perceptibly stouter the nearer they are to the opening of the mouth itself.
Of the bristles those were especially noticeable for thickness which grow between the lips of either jaw. They take the place

of teeth in pulling off the seaweed and prevent anything from falling out of the mouth while the animal masticates. The inferior maxilla is shorter than the superior; it alone is movable, but any
the lips of both maxillae move, as do the lips of cattle. With these the submarine plants which they tear off from the rocks with their arms are so cut off from the hard, uneatable roots and stems that they seem to be cut off with the edge of a dull knife. When the tide comes in these roots and stems are washed ashore, and lying there in great heaps on the seashore they betray to the visitor the present quarters of these guests, inasmuch as the stems of sea plants are tougher and thicker than those of land plants, the lips are made much stronger and harder than are the lips of any of the land animals; therefore the lips are also inedible, and can not be softened by boiling or in
The internal structure of the lips is so arranged
other
way.
that when cut they are like a checkerboard, consisting of very small squares; there are countless very small, thick, red, rhomboid or trapezoid squares, with which others that are white, tendinous, full of cells like network and containing liquid oil, are interspersed in equal numbers. These lips when boiled in a great amount of oil, and when this oil
water very easily yield
is tried out the white cells appear like so much tendinous network. The purpose of this structure seems to me to be a threefold one: (1) That the strength and density of the lips may be increased, and that they may not be so easily exposed to any danger from without; (2) that the heavy lips may be more easily raised and moved, inasmuch as the origin and insertion of the muscles (caput et caudae horum musculorum) are so disposed that the origin of the muscles is set obliquely to the opening of the mouth, and the insertion of the muscles obliquely to the top of the head; so that with their beginnings and ends the lips make, as it were, a wreath of muscles; (3) that by means of this structure the lips may be moved with a sort of spiral motion, and that, since the head on account of the continuous thick crust can
for them
be moved only with difficulty, it may not be necessary to move the whole body as often as they wish to pull off the tenacious seaweed.

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THE MANATEE
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DE BESTIIS MARINIS
They masticate differently from all other animals; not with teeth, which they lack altogether, but with two strong white bones, or solid tooth masses, one of which is set in the palate and the other is fastened in the inferior maxilla, and corre-

sponds to the first.
The insertion itself, or connection, is entirely anomalous, and would be expressed by no known name; gomphosis we can not call it, because the bones are not fastened in the maxillae, but each is held by many papillae and pores, pores and papillae alternating, in the palate and in the inferior mandible. Besides, in front it is inserted into the papillary membrane of the internal upper lip, and at the sides in the grooved edge of the bone, and at the back, with a double process, into the palate and inferior maxilla, and is in this way made firm.
These molar bones are perforated below with many little holes, like a thimble (netricum digitale), or like a sponge, in which the arteries and nerves are inserted in the same way as in the teeth of other animals. Above they are smooth and excavated with many winding, wavy canals, and between them are eminences which in mastication fit into the canals of the corresponding bone so perfectly that the seaweed (fuci) is ground and mashed between them as between a fuller's beams or between millstones. I have had a drawing made of these bones, which will explain more clearly what is less intelligible from the description.[1]
The nose is situated in the farthest tip of the head, as in the horse; there are two nostrils, and a thick cartilaginous column 1½ inches wide between them. The nostrils themselves are 2 inches long and just as wide in diameter. They are flat, and stretch back with many curves or labyrinths. Inside, the nostrils
Tab. XIV, online at http://dz-srv 1.sub.uni-goettingen.de/sub/dighib/loader?ht=VIEW&did=D151404
are very wide, wrinkled, and covered over with a nervous
From
membrane, which is perforated with black
many
pores.
each pore grows a bristle as thick as cobbler's waxed-end, a half inch long; they are easy to pull out, and they take the place of vibrissae in other animals.
The eyes are situated exactly half way between the end of the snout and the ears in a line parallel with the top of the nostrils, or just a very little higher. They are very small in proportion to so huge a body, being no larger than a sheep's eyes. They are not provided with shutters, or lids, or any other external apparatus, but protrude from the skin through a round opening, scarcely a half inch in diameter. The iris of the is
eye
black, the ball livid; the canthi of the eye are not seen except when the skin is cut away around the opening of the At the
eye.
inner canthus of the eye there is a cartilaginous crest (precisely like that of the sea otter), which, when necessity arises, covers over the whole eye and takes the place of a nictitating membrane adapted to warding off and removing any injury that might chance to fall while the animal feeds. This cartilaginous crest in the back part constitutes one wall of the lachrymal sac,

with which it is joined by a common nervous membrane. When the lachrymal sac is cut a great amount of sticky mucus is found in its cavity. The sac itself would easily hold a chestnut, and inside it is enveloped in a glandular membrane.
The ears outside open only with a small hole, like the seal's. There is not the slightest trace of an external ear, and the holes can be seen only by examining very closely; for the opening of the ears can not be distinguished from the rest of the
pores, and
would scarcely admit the quill of a chicken's feather. The internal canal of the ears is smooth and covered with a highly polished black skin, and when the muscles of the occiput are separated from it, as they may easily be, it betrays itself by its own color and can be seen.

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is 12 inches long and 2½ inches wide; and is like
The tongue
that of an ox. It is pointed at the end and the surface is rough with short papillae like a file. It is so deeply hidden away in the fauces that to many the animal has seemed to be without a tongue; for drawn as far forward as it may be by the hand, it still can not be made to reach the froenum, but will fall short of it by 1½ inches. If it were longer, as in other animals, it would be in the way in mastication.
The head, like the neck, is ill defined, and joins the body in such a way that a line of distinction is nowhere visible, as is the case with all fishes; but what obscurely suggests a neck is shorter by one-half than the head itself, and is cylindrical and more slender than the occiput in circumference. Notwithstanding, it is not only constructed with movable vertebrae, but has its independent action, a motion observed in the living animal only when it feeds; for it bends its head in the same way as cattle on dry land, but the thick and shapeless cuticle makes the quiet or dead animal look as though it were provided with an immovable neck, for no trace of vertebrae is to be seen at all.
From the shoulders toward the umbilical region it
rapidly wider, and from there on to the anus it again grows rapidly slender; the sides are roundish and paunched like a belly which is swollen with a great mass of intestines, and elastic and puffed up like an inflated skin, and diminishes in size from the umbilical region toward the anus, and again from the mammae toward the neck.
grows
When the animals are fat, as they are in spring and summer, the back is slightly convex; but in winter, when they are thin, the back is flat and excavated at the spine with a hollow on either side, and at such times all the vertebrae with their spinous processes can be seen.
The ribs rise on both sides in an arch to the back, and where

they are joined to the vertebrae of the back by amphiarthrosis, as they are in a man, they extend downward like a bow, and in the

place where they are joined on both sides to the vertebrae they make a double hollow on the back.

At the twenty-sixth vertebra the tail begins, and continues with thirty-five vertebrae. The tail grows perceptibly thinner toward the fin. It is not so much flat as rather somewhat quadrangular, for all the vertebrae of the tail have two epiphyses [zygapophyses] and four processes. Of these the lateral processes are broad, flat, and blunt at the point. The spinous process on the dorsal side or spine (processus superior in dorso seu spina) is sharpened; the lower one is a broad, flat bone, like unto a Greek lambda. This is joined by a cord to the main body of the tail and is fastened to it with very strong ligaments and tendons. As a result of this quadruple position the muscles of the tail fill these cavities of the vertebrae and the angles between the processes, and so the tail itself gets the form of a square oblong with obtuse angles.

For the rest the tail is thick, very powerful, and ends in a very hard, stiff, black fin, which is not divided into rays, but solid, and is in substance like prepared whale-bone, and consists of nothing but layers, one upon the other, as if one solid piece. This fin is frayed out for a distance of 9 inches from the extremity, and is something like the fins of fishes that are spined with a ruder sort of spines. The fin itself that ends the tail is 78 inches wide or long, 7.8 inches high, and 1.5 inches thick, and is inserted in the muscles of the tail as if by gomphosis, or a triangular canal.:

The fin of the tail is somewhat forked, and both cornua, differently from the tail fins of larger sea fishes, as the shark and

1 There is an evident omission here, as these measurements would give the animal an absurdly narrow tail, whereas we know from the references to the power of the animal, as well as from the figures that have been preserved, that the flukes were broad and powerful. The vertebræ and their muscles lie in the fibrous mass of the flukes as if driven in.-ED. [1899 note]

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the like, are of the same magnitude. In this respect it agrees with the whale. And so the caudal fin is parallel with the sides, as is the case of the phocaena and balaena, and not with the back, as is the case with most fishes. With a gentle sidewise motion of its tail it swims gently forward; with an up-and-down motion of the tail it drives itself violently forward and struggles to escape from the hands of enemies who are trying to draw it in.

The strangest feature of all, in which this animal differs from all other animals both of land and sea and from amphibia, is its

arms, or, if you please, its front feet; for two arms, 26.5 inches long, consisting of two articulations, are joined immediately to the shoulders at the neck. The end of the humerus is joined to the scapula by arthrodia.

The ulna and radius are like a man's; the ulna and radius terminate bluntly with tarsus and metatarsus. There are no traces of fingers, nor are there any of nails or hoofs; but the tarsus and metatarsus are covered with solid fat, many tendons and ligaments, cutis and cuticle, as an amputated human limb is covered with skin. But both the cutis, and especially the cuticle, are much thicker, harder, and drier there, and so the ends of the arms are something like claws, or rather like a horse's hoof; but a horse's hoof is sharper and more pointed, and so better suited to digging. On the back (supine) these claws are smooth and convex, but underneath they are flat and hollowed out in a way, and rough with countless very closely set bristles, half an inch long and hard like a brush.

I have seen in one animal these claws divided into two parts, like an ox's hoof. The division, however, was no more than marked, and that only in the cuticle; this happened more by mere chance than by the will of nature, and was the more easy and the more possible as the cuticle that covered the claws was disposed on account of its dryness to crack.

THE MANATEE

26

Now, this Platonic man, as the eminent John Ray was pleased in jest to call him, performs with these arms various offices: with these he swims, as with branchial fins; with these he walks on the shallows of the shore, as with feet; with these he braces and supports himself on the slippery rocks; with these he digs out and tears off the algae and seagrasses from the rocks, as a horse would do with its front feet; with these he fights, and when taken with a hook and dragged from the water upon dry land he resists so vehemently that the cuticle surrounding these arms is often torn and pulled off in pieces; and finally with these the female when smitten with the sting of passion, swimming prone upon her back, embraces her covering lover and holds him and permits herself in turn to be embraced.

The two breasts are different from those of most other animals, but in place and form are exactly as in man; they are situated one under each arm; and one breast is a foot and a half in diameter, convex, rough with many spiral wrinkles, full of glands, very hard harder than a cow's
and without any
intermingling fat. But the adipose tissue that surrounds the whole body rests upon them only with the same thickness as everywhere else, but the cuticle is thinner there and softer, and more wrinkled, and the papillae are likewise surrounded with a black cuticle with circular wrinkles, but soft. Under the arm itself, or axilla, the breast hangs, and when the animal is in milk the nipple is 4 inches long and 1½ inches in diameter; in those, however, which have gone dry, or have not yet given birth, it is so short and contracted that it seems nothing more than a

chance wart, for the breast is not swollen.
The milk is very rich and sweet, and in consistency is very much like sheep's milk, and very often it was my wont to get the milk in large quantities from dead ones in the same way as from cows. The nipple is very much wrinkled and a little higher than the rest of the breast. When the glands are cut they give out milk which is like that which I collected by squeezing the

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papillae. Ten or twelve lacteal ducts open into each papilla. The breasts when boiled are a little harder than beef, and give out the odor of
but mild.
game,
They come together after the human fashion, the male above and the female below. The penis of the male is 32 inches long, and with its sheath is bound firmly in front to the abdomen, and
- in a word, it is very coarse and ob-
reaches clear to the navel
scene to look upon, very much like that of a horse, and ends with the same sort of a gland, only larger.
The female pudenda lie 8 inches above the anus. The opening of the vulva is almost a triangle, and wider above, where the clitoris lies, and narrower toward the anus. The opening itself would without difficulty admit five fingers together. The clitoris is about 1½ inches long. It is cartilaginous and surrounded with a very strong, smooth skin, and is uneven, with many short wrinkles that fold together. The skin is variegated with yellow and white, and so is the vulva. The labia vulvae are very rigid and hard. The urethra empties into the vulva about 5 inches from the opening of the vulva. Below this is stretched a strong, crescent-shaped membrane, partly muscular and partly tendinous, which separates the vulva from the vagina uteri, properly so called, with a sort of vestibule, and makes a kind of hymen. But the aperture between the cornua of this membrane is so large that the penis of the male can without any difficulty enter the vagina. The vagina itself is 9½ inches long and covered with a very strong, fibrous membrane, which is ribbed longitudinally and hollowed out upon its surface with many furrows; between these furrows are seen a great many glands not larger than a pin's head, which secrete the mucus with which the vagina is covered all over. Next appears the uterus itself, spherical in shape, in size as large as the head of a cat. When I cut it open it was covered with mucus in the same way as the vagina, and wrinkled with a great number of folds half an inch wide. The substance of the vagina was so hard that I could

scarcely cut it with a knife. The ligaments of the uterus and of the fallopian tubes had precisely the same structure as those of a

horse.
The anus is situated 8½ inches below the pudenda. It is closed by a sphincter that is not very tightly contracted. In diameter it is 4 inches wide. The sphincter is white; the inside coating of the rectal intestine is smooth, slippery, olive-gray, just as in horses, where it is sometimes black, sometimes white spotted.

Description of the Internal Parts

I opened the heads of four animals, and with the greatest painstaking I searched for the stones, incorrectly so called, of the manatee. But so far was I from being able to find anything in the least like a stone or bone that from this I decided that either those bones were not found in all of them, or were, found only in certain climates, or, what seemed more probable, that Schröder and others who describe these bones as having the form of a ball, had, like too superficial and untrustworthy compilers, given it this round form after the analogy of the bezoar stone, and that they had never with their eyes seen stones or bones of the manatee as they described; and so we should rather understand that they meant the masticatory bones, or those white tooth masses to be found in the palate and inferior maxilla; and this was the more likely, as the description given by the eminent Samuel von Dale in his Pharmacologia coincides with my own; and his description also corresponds to these masticatory bones. For he gives, perhaps from autopsy (ex avtoyia), because he did not understand the mechanism of these bones, the following description: "The stone of the manatee is a white crustaceous bone similar to ivory, taken from the head, and it is of various forms," by which he no doubt meant to indicate the

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openings and meanderings of various forms to be seen upon the surface of both bones."

The cranium is very solid; it has but little cerebrum, and the cerebrum is not separated from the cerebellum by any bony plate. Of the rest I could observe nothing striking.

The oesophagus or gullet is very capacious. Inside it is surrounded with a very tough, white, fibrous membrane, and with many perpendicular wrinkles and folds it goes to the stomach, and there, before it ends, it concludes with a large number of little triangular appendices one line long, which turn back upward toward the oesophagus. The use of these is, I think, that they may hinder the reflux of the food back into the gullet, and at first sight they refute the preposterous opinion that has been held in regard to the animal's being a ruminant.

The oesophagus is inserted into the stomach nearly at the middle, as in the horse and the hare.

The stomach is of stupendous size, 6 feet long, 5 feet wide, and so stuffed with food and seaweed that four strong men with a rope attached to it could with great effort scarcely move it

from its place and drag it out.
The coats of the stomach could not by any means be separated; together they were 3 lines thick. A very strange fat omentum 2 lines thick surrounds the stomach. In the upper part it adheres firmly at the middle to the membranous coat of the stomach; for the rest, it is detached and seems more to warm the stomach with its own heat than to hold it in place. The inner coat of the stomach is white, smooth, and not wrinkled nor villous. But what was most peculiar, and perhaps incredible to many, is that I found contained in the stomach, and not far from the entrance of the oesophagus into the stomach, an oval gland
These bones are undoubtedly the ear bones, and that Steller failed to find them is due to the fact that he looked for them inside the cranial cavity. The ear bones of Rytina are not unlike those of the existing Manatee. ED. [1899 note]

and
as large as a man's head, and grown fast to it something like a large aneurism between the muscular and fibrous (nervosa) coat; this gland opened through the villous coat with
many pores
openings and exuded into the cavity of the stomach a great quantity of whitish liquid, in consistency and color like pancreatic juice. I had as a witness of this curious phenomenon the assistant surgeon, Bettge. What the character of this juice was I discovered by a double chance experiment; when I inserted a silver tube through the pores of the inner coat, in order to discover by blowing into them the excretory ducts, the tube came out black, as is wont to happen when silver touches sulphurous acid. I observed the same thing when I ordered Archippus Konovalow, the helper of the assistant surgeon, to take out the contents of the stomach with his hands, and when this was done a silver ring that he had upon his finger was stained with the same color.
The inner coat of the stomach was perforated by white worms half a foot long, with which the whole stomach, pylorus and duodenum, swarmed; and the worms had penetrated clear into the cavity of the glands. The gland when cut poured out a great quantity of juice. After that I could not examine any more stomachs, because I lacked the necessary assistance; and with the few men I had I could not, if I found an animal lying anywhere, turn it over upon its back; and therefore I am in doubt whether this gland is a constant thing or rather the result of some disease.
The pylorus was so large and tumid that at first sight I took it for a second stomach and was anxious to find the two others, too, because I thought the animal was a ruminant. But when I cut into the pylorus I was otherwise informed, and from its being like the stomach I saw that it was the pylorus. But to my misfortune it happened that the pancreas along with the duct into the duodenum and the ductus choledochus were cut, for the simple reason that the stomach could not be taken out whole

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with the liver on account of its great size, and besides, my assistants, who had been hired for just one' hour with tobacco, which took the place of money, became tired of the work. Yet I recognized that the pancreas was divided into two lobes and composed of many flat, rather large glands, and that it was, for so large an animal, comparatively small; for it did not extend in length beyond 4 inches.

There are more intestines in this animal than in any other, except, perhaps, the whale alone, which hitherto I have not been in a position to inspect. The abdominal cavity was so full that the abdomen was tumid and swollen like an inflated skin. Hence, when the common coverings and muscles of the abdomen were removed and the peritoneum received ever so slight a wound, the wind came out with such a whistle and hum as it is wont to come from an aeolipile. For the same reason the whole abdomen is covered with a very strong double, membranous, fibrous peritoneum for holding in the intestines. The peritoneum reaches from the os pubis to the sternum, and is attached on both sides to the false ribs, from each one of which strong tendons, spreading out in many rectilinear branches, run from both sides to the linea alba; and when the muscles of the abdomen on the surface of the peritoneum are removed the tendons meeting each other and crossing each other make the surface of the peritoneum tessellated like a checkerboard, and present a pleasing spectacle to the eye. Other like tendons grow from the inner side of the ribs and are seen to intertwine (impexi) tightly with the peritoneum on the inside, increasing its firmness as with horizontal processes. Both membranes run into a single one in the middle about the linea alba, but toward the sides they are double.

When the peritoneum is cut the intestines gush out violently, and without any outside assistance they move from their original place, because they are found always so tightly stuffed that from oesophagus to anus they make a solid pack without

any open space. The thin intestines are smooth, rolled up in a great amount of fat; they are round and 6 inches broad in diameter. If only a very slight aperture should be made with the point of a knife, the liquid excrement (a ridiculous thing to behold) would squirt out violently like blood from a ruptured vein; and not infrequently the face of the spectator would be drenched by this springing fountain whenever some one opened a canal upon his neighbor opposite, for a joke.

The coecum was very large, as was also the colon, and by a ligament that extended lengthwise on either side was divided into many little cells. But the valve of the colon I could not find, search as I might. To be brief, the intestines were different from

a horse's in size and capacity alone, but not in structure. And so the final product of this workshop is so like the excrement of horses, in shape, size, smell, and color, and all other attributes, that it would deceive the most expert stable boy. And I will not deny that on the first days after our arrival on the island I was ignominiously deceived; I considered it no slight marvel, but I did not make the boast to have found what the boys did in the beans (faba; fabula (?)),when I found the stuff frozen together and so inexplicable (cimmelium). Now, I, not knowing from whence it came, argued from utterly false premises to an absolutely true conclusion that America lay opposite this island and not far away (for up to that time the continent had not been seen on account of the autumnal fog). But since horses are not kept in Kamchatka, but are kept in parts of America, the fact that the dung was brought over there whole and not dissolved, was an unquestionable proof of the proximity of land.

The whole intestinal tract, from gullet to anus, when this Augean stable was thoroughly cleansed, measured fully 5,968 inches, and so the intestines are twenty and a half times as long as the whole living animal.

The mesentery is exceedingly thick and half covered with a mass of little glands, varying in size from that of the acorn to

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that of the walnut. The lacteal, as well as the lymphatic vessels, I could not observe because of the opacity of the very fat, thick mesentery, although I searched while the intestines were still warm, for the veins are only obscurely and darkly transparent, inasmuch as they are as thick as one's finger.

A very strong, double membrane constitutes the pleura. Inside this, one continuous muscle an inch thick is interposed and covers both sides.

The urinary bladder, 2 lines thick, was very strong, but not larger than a man's head, and smaller than the bladder of an ox.

The trachea is composed of long, cartilaginous circles or semicircles, but has an entirely anomalous structure. One continuous piece of cartilage is twisted into a spiral and covered with a strong continuous membrane, both inside and outside. But the spirals of the trachea are not everywhere equal in breadth, but in some places the edge of the upper circle is hollowed out to receive the opposite eminence of the lower circle, and so makes it crooked. And so, by the help of this double membrane that encircles the trachea, the spirals are kept from being dislocated, either inside or outside. Through this mutual intertwining the rings are prevented from being loosened laterally. By this spiral structure the trachea is separated into branches below the glottis and reaches to the bronchi, and is seen to be such in the very substance of the lungs; it is so constructed for no other reason, perhaps, than that by the continuity of these spirals the huge mass of lungs may be more easily

lifted up in breathing; for neither muscles nor anything else give so much help to the motion of lungs, which are situated in the back.

The glottis is like that of an ox, but is closed by the epiglottis much more closely and firmly than is the case in the land quadrupeds, so the epiglottis is in proportion much thicker. The diameter of the trachea below the glottis is 4.2 inches.

The thyroid gland is very large, and when cut it poured out a large quantity of liquid of double consistency and color: that which came from the larger exterior glands when cut was of the color of milk, but thicker than sheep's milk, and sweet to the taste; that which came from the middle portion of the gland or receptacle for the gland was contained in a membranous sac of its own; it was glutinous and had the consistency of meal poultice; it was somewhat sweet, with a very slight taste of bitter, and was yellowish-white in color. It occurred to me only in the last animal that I opened to make a closer inspection of this gland. I am very sorry that I did not think of it sooner, and take the pains to have the trachea, with the gullet, heart, and the rest of the viscera taken out entire. But it was not possible without the help of many men to do so with an animal so huge. If I had been in a position to do that, I should have observed whether or not it unloaded this liquid through some tube into a duct of its own, or into the stomach, as Vercellonius thought, or somewhere else. I saw the duct only after it was cut, but whither it led I neither saw nor do I wish to conjecture.

As to the heart it differs in many respects from the heart of all other animals: (1) In regard to situation, the apex of the heart stands in a line oblique to the sternum, the base in a line oblique to the back. (2) As to connection, the heart does not rest against the mediastinum, but is detached on every side and has no mediastinum at all. (s) It has a pericardium (but this does not envelope the heart closely) and a sac; but it forms rather a species of cavity in the thorax and lines the thorax. Toward the back and the base of the heart the pericardium is nearer to the heart than it is anywhere else. When the animal is feeding, the heart itself, with the pericardium, hangs not quite perpendicularly but somewhat obliquely from back to sternum; and so there the pericardium takes the place of a mediastinum. Lower down toward the abdomen the pericardium is fastened to the inner wall of the diaphragm, and with it constitutes one wall;

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and so it rests against the pleura at the sides. (4) As to size, when placed in a scale it weighed 34% pounds, and was from base to apices 2 feet 2 inches long, and from the extremity of one auricle to the other 2% feet broad; and so it was broader than it was long. (5) As to form, it was broad and thick, rather

than long, and what was the greatest peculiarity of all it ended, not like a top in one apex but, in accordance with the number of ventricles, in two apices. Now, this slit in the apex extends to one-third the length of the heart, and from there on the two apices coalesce in one and form the septum of the heart, dividing the ventricles. The left apex is just a little longer than the right and thicker in circumference. The ventricles of the heart are extended farther below the septum, each into its own apex. The chordae tendineae and the columnae carniae (cordis trabes) or sulci (furrows) exceed the equipment of the human heart, not only in size and strength but also in number. The valves are the same in the pulmonary vein, the vena cava, the aorta, and the pulmonary artery, as in a man. The base of the heart is surrounded with a great quantity of thick fat that is placed around it like packing, distributed everywhere to the thickness of half an inch. Below this the large coronary veins of the heart are seen, covered inside with little valves which I have never observed anywhere else before in any other animal. With great care I searched for the foramen ovale and for the ductus arteriosus Botalli, but in vain. When I cut through the cavity of the pericardium I found it half full of liquid, so that even by this quantity alone I was led to believe that this liquid was unnatural (praeter naturalem), and that at the end it had been collected into this cavity, from whatsoever source it may have been secreted, in consequence of the slow and distressing death of the animal.

The lungs are two very long, white lobes that extend to the middle of the abdomen, one on either side along the dorsal spine. They are, however, detached, and not fastened anywhere,

in which respect they differ from the lungs of birds, although they agree with them in respect to their position in the back. Either lobe is covered outside with a very strong membrane, and so if one should think only of the external structure and color of the lungs one would scarcely consider them to be lungs at all.

The liver consists of two very large lobes and a third of quite peculiar form; the third is almost square and looks like a blacksmith's anvil. It is situated half way between the two larger lobes, and is raised above them and lies immediately under the sternum. Outside, the liver is covered with a very strong fibrous membrane, so that it suggests anything but a liver. Through this membrane, in the gibbous part, the branches of the coeliac vessels (venae celiacae) excessively tumid, shine through like a tree, blue in color. When this membrane was cut the substance of the liver appeared, in color a tawny yellow, like that of an ox, but externally soft and most delicate in structure, so that at the touch it dissolved as if putrid under my hand.

The animal has no gall bladder. But the ductus choledochus, like that of a horse, would easily admit five fingers together; and so it was very capacious; it was half a line thick and very strong, whitish outside and yellow inside, and, opening into the duode-

num, it coalesces along with the pancreatic duct into one canal. The kidneys are hidden away in a cavity of the lumbar region on either side of the dorsal spine. They are 32 inches long and 18 inches wide; they have the ordinary form of kidneys and are included in a very strong membrane; when this was removed there appeared a great number of renules of the same form, as in the seal and the sea otter, but in size they were much larger than these. They were 2 inches long and 1½ inches wide on the surface, and they were pyramidal in form toward the interior. Each one of these lobules (renunculi) is provided with an urethra, papillae, and artery of its own. The urethras form six larger principal branches, and at last carry down the urine

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through one canal to the urinary bladder. But the pelvis is like an elephant's.

I overlooked the suprarenal capsules (capsulae atribilariae), and also the spleen, and likewise the internal organs of generation, and many other things which occurred to me in order only when I had no longer time nor opportunity for making full observations.

Brief Description of the Bones

As to the bones of the manatee, the bones of the head in respect to strength and firmness are like those of a horse, but in respect to size and thickness they surpass the bones of all animals of the land.

The bones of the head taken together are not larger than a horse's head, nor are they very different in respect to form and articulation.

The cranium is anteriorly entire, without any suture, extending toward the nasal bones in two hard processes, and joining the nasal and maxillary bones by an arthrodia, while the nasals join the maxillaries by ginglimus. The nasal bones meet in a rough suture. The temporal bone joins the cranium by suture, but the occipital by coalescence, being very hard and almost like rock. The inferior maxillary in adults consists of one bone, in calves of two.

The head from the nares to the occiput is 27 inches long, and at the occiput 13½ inches wide.

There are sixty vertebrae in all: six in the neck, nineteen in the back, and thirty-five in the tail.

There are five pairs of true ribs and twelve of false.

'Really the frontals. - ED. [1899 note]

* Given in the previous table as 10%.- ED. [1899 note]

The body of the vertebrae of the neck is narrow, in general structure like the vertebrae of the horse's neck. How much they differ in certain special features I will not indicate, as I have no books nor a horse's skeleton, nor should I trust my memory or

imagination.
The spines of the dorsal vertebrae are sharp and broad, and in lean animals, as there is no thick cuticle or thick adipose tissue in the way, they are perfectly visible.
The vertebrae of the back in the region of the stomach and liver are ridged on the inside, but all the rest are rounded and lack this sharpened prominence.
The vertebrae of the tail have each four processes; the lateral processes are long and broad; the superior process is like the lateral process in width but is shorter; and the inferior processes (chevrons) are single bones like the Greek lambda in shape, and are fastened to the body of the vertebrae by a cord and held firmly with very strong ligaments. All the vertebrae are joined together longitudinally by a great number of very strong, broad tendons, and are everywhere so covered up that because of them the bones can not be seen.
The five pairs of true ribs are joined to the sternum with cartilage. Both the true and the false ribs are all solid and very heavy and thick.
The sternum in the upper portion where the ribs are fastened on is cartilaginous; in the lower portion toward the notch of the heart (scrobiculum cordis) it is bony to a distance of a foot and a half.
In place of the innominate bone of the hip there are two bones, one on each side in size and form like the ulna of the human skeleton, and joined with very strong ligaments to the thirty-fifth vertebra on one side and to the os pubis on the other. It has no clavicles.
The arms consist of two bones, tarsus and metatarsus.

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DE BESTIIS MARINIS
THE MANATEE
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Description of Its Habits and Nature
I should have abstained from an extended description of this animal if I had not observed that there are in existence some brief and imperfect histories of the manatee, swarming with fables and false theories after the manner of the last century and the century before, in which the writers of natural history saw only through a lattice what they might have seen with their eyes; when investigating the unknown habits of animals, their character, and a thousand other things that have nothing to do with their subject, they only involved the best known facts in more than Cimmerian darkness.
Therefore I have endeavored to give a clear and succinct idea of its external form and that of the structure of its internal parts by stating its agreement and disagreement with others, next by explaining the mechanism and nature of the animal, and after that the use of its parts for food, medicine, and other things, and finally to add in perfect truth what I observed with my own

eyes in regard to the movements, nature, and habits of the living animal.

Various things combined to cause me many disappointments. The weather at the time when the animals were captured was almost constantly rainy and cold; my observations had to be made in the daytime; then there were the tides of the sea; and the droves of blue foxes (isatides) would spoil everything with their teeth and steal from under my very hands; they carried away my maps, book, and ink when I was studying the animal and worried me when I was writing; the great size of the animal itself and the bulk of its parts were also a hindrance, as I had to be both observer and workman, as all the rest were anxious about the construction of a ship and our liberation from the island. At my own expense I could hire them for barely an hour at evening time for some of the simpler assistance, and in their ignorance and dislike for the work they would tear everything to pieces, and acted according to their own inclinations; so the injury they wrought and the loss they caused ought to be commended in that they did not desert me entirely. Not a single gut could I get out entire, nor unfold if I had got it out, so as to do anything worth while; so that for all the pleasure I got from certain observations I had twice as much trouble and annoyance in consequence of those useful things which I had to leave alone. So I beg of my kind readers, when they have finished reading this feeble description, that they will judge it by my will and my zeal rather than by the circumstances.

I had prepared a skeleton of a manatee calf, and I had taken the cutis with the cuticle separated from it and stuffed it with grass to bring it home with me; but when I saw that on account of the small size of our craft this was impossible I wanted to bring with me at least the spoils (skin), but even this wish was vain. I intended to do the same with the sea lion, the sea bear and the sea otter, but I was reckoning without my host, for in Kamchatka there is no hope of getting everything.

But let me cease from narrating my complaints and my hindrances. The manatee is not the sea cow of Aristotle, for it never comes upon dry land to feed. And it is of little consequence whether it is the same or not, for it is not this animal that he described; indeed, he never saw it and never heard anything about it to tell. In the second place, I remark that Lopez Francisco Hernandes themselves saw the animals, and that Clarissimns Clusius and Ray, misinformed by them, have affirmed many things of the animal that are inconsistent with truth and autopsy.

1. The animal has no hair at all that can properly be called hair. It has bristles rather, or hollow quills, and these are found only around the mouth and under the feet.

2. The head of this animal is not that of a calf, as Cl. Clusius says; not that of an ox, as Hernandes was pleased to describe it;

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but in the character of its covering it is like no other animal, but has its own peculiar appearance.
3. The feet are entirely without claws, but skin covers them as it does the bone of an amputated limb, so that the animal moves upon a skin that is rough with bristles.
4. As to the fact that Hernandes attributes to this animal nails like those which men have, in order to make it more like the Platonic man, that is equally false, for the animal has no fingers at all any more than nails, unless perchance the hoof of a horse, to which it bears a certain resemblance, impresses anyone as being like a human nail.
it is evident even from this how much
5. And so, by the way,
obscurity envelops this subject if we start with false premises and arrive at worse conclusions. For instance, all authors with one consent agree that this animal ascends rivers and feeds that it may manage to get along the banks, for
upon the grass
they may perhaps have heard from the people that it feeds on herbs; but those are not land herbs, but seaweeds.
Nor does the statement have the appearance of truth, that they are in the habit of lying upon the rocks and of coming up on the land, even if I say nothing of the fact that the structure of the animal is totally unfitted for moving on dry land. Indeed, it happened that as the tide went out the waves receded from under one of the animals sound asleep and left him high and dry upon the shore; but he was helpless and unable to get away, a pitiable object, at the mercy of our cudgels and axes.
That this animal should be tamed seems more likely than do the anecdotes that are given of its remarkable sagacity, since even the untamable can be tamed through its stupidity and greediness. It happened to me on one unlucky occasion that I could watch the habits and ways of these beasts daily for ten months from the door of my hut, and I will briefly note down the observations that I made with great care.
THE MANATEE
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These animals are fond of shallow sandy places along the seashore, but they like especially to live around the mouths of rivers and creeks, for they love fresh running water, and they always live in herds. They keep the young and the half-grown before them while they feed, but they are careful to surround them on the flank and rear and always to keep them in the middle of the herd. When the tide came in they came up so close to the shore that I often hunted them with my stick or lance, and sometimes even stroked their backs with my hand. If they were badly hurt, they did nothing but withdraw to a distance from the shore, and after a short time they would forget their injury and come back. Most commonly whole families live together in one community, the male with one grown female and their tender little offspring. They appear to me to be monogamous. The young are born at any time of year, but most frequently in au-

tumn, as I judged from the new-born little ones that I saw about that time. From this fact, as I noticed that they copulated by preference in the early spring, I concluded that the foetus remained more than a year in the womb. From the shortness of the [uterine] cornua (er cornuum brevitate), and from the fact that there are only two mammae, I infer that they have but one calf, and I have never seen more than one with the mother at a time.

and ac-

These animals are very voracious and eat incessantly, and because they are so greedy they keep their heads always under water, without regard to life and safety. Hence a man in a boat, or swimming naked, can move among them without danger and select at ease the one of the herd he desires to strike

complish it all while they are feeding. When they raise their noses above the water, as they do every four or five minutes, they blow out the air and a little water with a snort such as a horse makes in blowing his nose. As they feed they move first one foot and then the other, as cattle and sheep do when they graze, and thus with a gentle motion half swim and half walk.

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the back and sides
projects above the
Half of the body

water. While they feed, the gulls are wont to perch upon their backs and to feast upon the vermin that infest their skin, in the same way as crows do upon the lice of hogs and sheep. The manatees do not eat all seaweeds without distinction, but especially (1) Crispum Brassicae Sabaudicae, with cancellate leaf [sea-cabbage]; (2) that which has the shape of a club; (3) that which has the shape of an ancient Roman shield; (4) a very long seaweed with a wavy ruffle along the stalk. Where they have stopped, even for a day, great heaps of roots and stems are to be seen cast upon the shore by the waves. When their stomachs are full some of them go to sleep flat on their backs, and go out a distance from the shore that they may not be left on the dry sand when the tide goes out. In winter they are often suffocated by the ice that floats about the shore and are cast upon the beach dead. This also happens when they get caught

the

rocks and are dashed by the waves violently upon them. In the winter the animals become so thin that, besides the bones of the spine, all the ribs show. In the spring they come together in the human fashion, and especially about evening in a smooth sea. But before they come together they practice many amorous preludes. The female swims gently to and fro in the water, the male following her. The female eludes him with many twists and turns until she herself, impatient of longer delay, as if tired and under compulsion, throws herself upon her back, when the

male, rushing upon her, pays the tribute of his passion, and they rush into each other's embrace.
among
Their capture used to be effected with a large iron hook whose point resembled an anchor's fluke. The other end was secured by a very long, stout rope to an iron ring. A strong man took this hook and entered the boat with four or five others, and while one held the rudder three or four rowed gently toward the herd. The spearman stood in the prow of the boat holding the hook in his hand, and struck as soon as he was near enough.

As soon as this was done, thirty men standing on the shore with the other end of the rope in their hands held the animal, and in spite of its frantic efforts at resistance they dragged him laboriously toward the shore. The boat was held steady by another rope, and the men wore the animal out by constant blows, until, tired and rendered thoroughly passive by the spears, it was finished by their knives and other weapons and drawn to land. Great pieces were cut from the animal while still alive, but all that he did was to work his tail vigorously and to brace himself with his fore feet, so that great pieces of skin were often torn off. Besides, he breathed heavily, as with a groan, and the blood from the wounded back spurted up like a fountain. As long as he kept his head under water the blood did not flow out, but as soon as he raised his head to breathe the blood leaped forth anew. This happened because the lungs, being situated at the back, were wounded first, and as often as they were filled with air they increased the force of spurting blood. From this I have concluded that the circulation of the blood in this animal, as in
- in the open air, through the
the seal, is in a double fashion
lungs, but under water, through the foramen ovale and ductus arteriosus, although I did not find both. But I think it happens that they breathe differently from fishes, so that they can better swallow solid food, rather than for the sake of promoting circulation (propter deglutitionem solidorum potiusquam propter circulationem promovendam).
The full-grown, very large animals are more easily taken than the young ones, because the young move about far more vigorously, and even if a whole hook should be fixed in one of them it can get free by tearing the hook out of the skin. We saw this done more than once.
But if one animal is caught with the hook and begins to plunge about rather violently those near him in the herd are thrown into commotion as well and endeavor to assist him. To this end some of them try to upset the boat with their backs,

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others bear down

the
upon
try to break it, or endeavor
and
rope
to extract the hook from the back of their wounded companion with a blow from their tails, and several times they proved successful. It is a very curious evidence of their nature and of their conjugal affection that when a female was caught the male, after trying with all his strength, but in vain, to free his captured mate, would follow her quite to the shore, even though we struck him many blows, and that when she was dead he would sometimes come up to her as unexpectedly and as swiftly as an arrow. When we came the next day, early in the morning, to cut up the flesh and take it home, we found the male still waiting near his mate; and I saw this again on the third day when I came alone for the purpose of examining the entrails.

As to voice, the animal is dumb and utters no sound, but only breathes heavily and seems to sigh when wounded. I will not venture to assert how much their eyes and ears are worth. Anyway, they see and hear but little, because they keep their heads under water. At all events, the animal himself seems to neglect and despise the use of these organs.

Of all those who have written about the manatee, no one has given a fuller or more careful account than that most curious and painstaking explorer, Captain Dampier, in his travels, published in English in London in 1702. As I read it I could find no fault with it, although a few statements did not correspond with our animal. For instance, he says that there are two species of manatees, in one of which the eyes are better than the ears, and in the other of which the ears are better than the eyes. What he says about the manner of hunting the animal, namely, that the Americans approach without any noise and without speaking, so as not to frighten the manatee, is no doubt true of places where they are caught in great numbers and have learned by long ex-

'It is of course to be remembered that Dampier was speaking of the true manatees Trichechus inunguis and T. latirostris. [1899 note]

perience that men are dangerous to them. It was the same way with the otter, seal, and blue fox (Isatis), which lived in this desert island and never saw a man before and never were disturbed while lying at their ease. They were slain with no trouble at all when we first came to Bering Island, but now they have become just as wild as those living in Kamchatka, and take flight at once as they discover, not only with their eyes, but even with their sense of smell, the approach of an enemy.

It sometimes occurred that these animals were cast up dead by storms around the cape called Kronotskoi, as well as about Avatcha Bay. Because of the food they eat they are called by the inhabitants, in their language, "Kapustnik" (Kraut Esser; weed eaters); this I learned after my return in 1742.

Now, I must tell the uses to which the parts of this animal

are put. The skins, which are very thick, firm, and tough, are used by the Americans, according to Hernandes, for the soles of shoes and for belts. I understand that the Tschuktschi use the skins for boats; that they stretch it with sticks and use it in the same way as the Koriaks use the skins of the largest sort of seals, called "Lachtak."

The fat underlies the cuticle and the skin and covers the whole body to the depth of a span, and in some parts is almost 9 inches thick. It is glandulous, stiff, and white, but when exposed to the sun it becomes yellow like May butter (butyri maialis). Its odor and flavor are so agreeable that it can not be compared with the fat of any other sea beast. Indeed, it is by far preferable to that of any other quadruped. Moreover, it can be kept a very long time, even in the hottest weather, without becoming rancid or strong. When tried out it is so sweet and fine flavored that we lost all desire for butter. In flavor it approximates nearly the oil of sweet almonds and can be used for the same purposes as butter. In a lamp it burns clear, without smoke or smell. And, indeed, its use in medicine is not to be despised, for it moves the bowels gently, producing no loss of appetite or nausea, even

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when drunk from a cup; and, in my opinion, it would do calculous persons more good than the masticatory bones or so-called stones (lapides) of the manatee. The fat of the tail is harder and stiffer and so more delicate when tried out. The flesh has a grain somewhat tougher and coarser than beef, and is redder than the flesh of land animals; and what is remarkable, even in the hottest days it can be kept in the open air for a very long time without any bad odor, even though all full of worms. I attribute this to the fact that the animal lives entirely upon seaweed and sea plants. These weeds contain a smaller proportion of sulphur and more sea salt and nitre. This salt prevents the loss of sulphur and the softening and decaying of the flesh, preserving it in the same way as salt or brine sprinkled upon meat; but they work even more powerfully, as these salts are more intimately mingled with the substance of the flesh and are combined more permanently with the sulphurous parts (or particles of sulphur?) (cum sulphureis partibus fortius cohaereant).

Although the flesh needs to be cooked longer, yet when done it has an excellent taste, not easy to distinguish from that of beef. The fat of the calves resembles fresh lard, so that you can hardly tell the difference; but their flesh is just like veal. When boiled it soon becomes tender, and if the boiling is continued it swells up like young pork so that it takes up twice as much space in the pot as it did before boiling; but the muscles of the abdomen, back, and, sides are far better. The flesh does not really refuse to be salted, as many have thought, but the salt only modifies it, so that it becomes quite like corned beef and very excellent in flavor.

The internal organs-heart, kidneys, and. liver-are very tough, and we did not try to do much with them, because we had a great abundance of meat without.

A full-grown animal weighs about 8,000 pounds, or 80 hundredweight, or 200 Russian "pud." There is so large a number of

these animals about this one island that they would suffice to support all the inhabitants of Kamchatka.

The manatee is infested with a peculiar insect something like a louse, which is wont to occupy and inhabit in great numbers especially the wrinkled arms, the udder, the teats, the pudenda, the anus, and the rough hollows of the skin. When they bore through the cuticle and the cutis, here and there wart-like prominences are produced by the lymphatic moisture that exudes. So these insects attract the gulls to perch upon the backs of the animals and hunt this dainty with their sharp beaks, thus rendering the animals, which are worried by the vermin, a friendly and welcome service.

These insects are for the most part half an inch long, articulated, six-footed, translucent, white or yellowish. The head is oblong, sharp, larger than a millet seed. In front extend two short, jointed little antennae half a line long. In place of a lower mandible it has two slender, two jointed little arms like a shrimp, very sharp and pointed on the end. Furthermore, in accordance with the number of his feet, he is composed of six articulations, convex on the back, and one-third of a line wide. But the ring of the thorax is twice as wide, and they grow narrower toward the tail. The ring of the thorax resembles the half of a lentil. On the sides of this a pair of thick claws grows, with two joints each. Each claw ends in a flexible point, by means of which it holds fast to the skin of the manatee; the rest of the legs are rather slender, all ending in prickly points, and gradually shorter. The last two are the shortest, and, growing out from the orbicular ring of the tail, form the end of the body itself and steer the insect as it moves.

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THE SEA BEAR'

The following is a description of the animal first seen and described by Dampier under the name "sea bear"; called by the Russians "Kot," gentilibus ad Sinum Penschinicum Tarlatshega. The description made on the 28th of May, 1742, on Bering Island. The largest weighing about 1820 Russian "pud" or 800 pounds.

Habits and Characteristics

Dampier has given us a description of this animal, called Kot by the Russians, which is, to be sure, brief and imperfect; but he mentions its characteristics so definitely and plainly and so clearly at first sight that I can not doubt that the animal is his "sea bear."

Report, as I gather from the account of the people, has declared that the sea bear, as it is called by the Rutheni and other people, is different. They say it is an amphibious sea beast very like the bear, but very fierce, both on land and in the water. They told, likewise, that in the year 1786 it had overturned a boat and torn two men to pieces; that they were very much alarmed when they heard the sound of its voice, which was like the growl of a bear, and that they fled from their chase of otter and seals on the sea and hastened back to land. They say that it [1] or fur seal.

*The Miller translation omits 15 pages of measurements and descriptions of the external and internal parts.

is covered with white fur; that it lives near the Kuril Islands, and is more numerous toward Japan; that here it is seldom seen. I myself do not know how far to believe this report, for no one has ever seen one, either slain or cast up dead upon the shore. This is certain, whether we consider the appearance of the body or the habits of the beast, it is more nearly related and more similar to no other land animal than to a bear.

They are never seen in the gulf of the Penshin Sea nor in the land of Kamchatka, nor do they go on shore in the Kuril Islands except very seldom; they are not taken except on three Kuril Islands, and from there to the mouth of the river of Kamchatka, in the so-called Bobrovi [sea otter] Sea, from latitude 50° to 56° N. These bears pass by the Kuril Islands in the early spring, and in September they are taken in small numbers about the mouth of the river called Shupanova and from there to Cape Kronotski in greater numbers. Here, to be sure, between the two capes, Kronotski and Shipunski, the sea is quieter and there are more inlets and recesses; hence the animals delay here longer as they pass by and more of them are caught. Almost all that are caught in the spring are females, and have the young almost ready for birth within them. The foetuses, when removed, are called "Viporotki." All that are found are put on the market. They are no longer to be seen anywhere from the first of June to the end of August, when, with their young, they return to the south. For many years these migratory animals have been a source of wonder and speculalation to the people who have been interested in hunting them. For, whence did these animals come in early spring? Whither were these very fat, these pregnant beasts, going in countless droves? What are the reasons for this migration? Why do they return with their offspring in the fall so thin, dry, and weak? And whither are they going?

From the fact that the animals come very fat from the south in early spring and return thither in the fall, it was naturally

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inferred that they had taken no long journey, and that their winter quarters could not be very far distant, else they would

become too thin upon the way. And from the fact that they were all going toward the east and were never seen beyond Cape Kronotski or the mouth of the Kamchatka River, either going east or returning home, they concluded that there must necessarily be some land, either island or mainland, near the land of Kamchatka and in a line with Cape Kronotski.

Among amphibious sea beasts these are the migratory animals, like geese, swans, and other sea birds, or like catanadromous trout among fishes; the blue foxes, hares, and mice occupy this place among quadrupeds. Now the migration of the blue fox is undertaken because food becomes scarce. Birds and fishes migrate to lay their eggs or to indulge undisturbed their sexual instincts, and, because their strength is reduced or their feathers shed, and hence they are unable to flee from their foes until these can grow once more, solitary places are chosen by birds and quiet lakes by fishes. Accordingly, for a similar reason, these northern places are chosen by the sea bears; and these desert islands, lying in great numbers between America and Asia from 50° to 56° north latitude, are chosen for the following reasons.

That the mothers may bear their young there upon the land and after parturition recruit their strength; further, that the young may there be brought up and nourished and may grow strong enough in three months to follow their parents home in the autumn. The pups are fed with their mother's milk for two months. The mothers have nipples corresponding in form, size, and position with those of the sea otter, and they are situated near the pudenda. They bear one pup at a birth, very seldom two. After parturition they gnaw the umbilical cord off from the pups with their teeth, as dogs do, and lick it till it is dry, so as to keep the blood soft until it heals; and they devour the afterbirth greedily. The pups are born with their eyes open, and their eyes

are as large as those of a calf. When they are born they have thirty-two teeth started out on a level with the gums; but there are four larger canine teeth, ferocious and suitable for battle, still hidden in the gums. These come out after the fourth day. When the pups are born they are covered with shining black fur all over. But the fourth or fifth day after birth the fur under the front legs changes color perceptibly and takes on the color of the hair of Pliny's goat; and after a month the belly and sides become speckled with an intermixture of hairs of the same color. At birth the males are much larger and darker, and in the years that follow they get a blacker coat than the females. These latter become almost wholly ashy gray, but have rusty spots under the forelegs. The females differ so much from the males in size, weight, and strength, that a careless observer might almost take them for a different species, so timid and so little ferocious are they.

The parents love their young exceedingly. The females, after parturition, lie in crowds upon the shore with their pups and spend much time in sleeping. The pups, however, directly in the

first days play together like children, and imitate their parents in playing at copulation, and practice fighting until one throws the other to the ground. When the father sees this he rises up with a growl and hastens to separate the combatants, kisses the victor, licks him with his tongue, tries with his mouth to throw him upon the ground, and makes vigorous demonstrations of his love for the youngster, who struggles bravely against it. In short, he rejoices that he has a son worthy of himself. But they are less fond of the lazy and ease-loving pups. Hence some of the young are always near the father, others near the mother. The males are polygamous; one often has eight, fifteen, or even fifty wives. He guards them with anxious jealousy, and goes into a rage if another male comes ever so little too near. Although many thousands of them lie upon the shore together, yet it may always be observed that they are separated

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the one male lies with his wives, his sons, and daughters, as also his yearling sons who are not yet old enough to have a harem. One family often numbers as many as 120. For this reason also they swim in the sea in shoals.

All the married ones are vigorous, but the aged and those that are too old for the warfare incident to keeping up a harem, or that are driven to it by impotence or the voluntary desertion of their wives, lead a monastic life, and pass it constantly in fasting and sleep. These married ones are the fattest of all, and without the females they come first to the island, like scouts. All the males have a strong odor, but theirs is the worst. These old animals are very cross and very savage. They live a whole month in one place without food or drink; they sleep all the time, but rage with exceeding fierceness at all who pass by. Indeed, they are so very fierce and jealous that they would a hundred times rather die than give up their place. And so if they see a man they go out to get in his way and prevent his passing; one of the others meanwhile gets his place and is ready to fight with him. When we were obliged to come into conflict with them because of the necessity of continuing our journey, we threw great stones at them. They in turn would rage at the stone thrown at them just as a dog would, and start up in defiance and fill the air with their terrible roaring. What we first attempted was to knock out their eyes and break their teeth with stones; even though wounded and blind they would not give up their place or dare to leave it; for if one of them went even a pace away, so many enemies would rise up and attack him with their teeth as he fled that he should not leave his place, that even if he escaped our hands he would be torn to pieces by his fellows. Indeed, if one leaves his place, the rest run up to prevent his

flight; one attacks the other on suspicion of wishing to flee, and from a single attack so many duels originate that oftentimes for 2 or 3 furlongs by the seashore you can see nothing but duels, battles, and a thousand sights absurd but bloody, accompanied by a terrific roaring and growling. While they fight with one another they let us alone, and we are able to pass by unmolested. If two fight against one, another comes to his aid, for they can not bear to see an unequal combat. When there is fighting going on, others who are swimming in the sea lift up their heads to see the outcome of the contest, and finally they are worked into such a rage themselves that they come on shore and mix in crowds with the combatants and make the sight more awful. I often went with my Cossack and attacked one on purpose and knocked out his eyes; and when I had done that I pelted four or five others with stones. When these pursued me I took refuge near the one I had blinded. As he could not see but heard his brothers in pursuit and did not know whether they were fleeing before us or pursuing us, he would attack his fellows. Meanwhile, quite at my ease, I would sit down in some high place and watch them fighting together for some hours. The blind one would attack all that came near, whether enemies or friends, and was pursued by all as a common foe. If he fled to the sea he was pulled out again, and on land was torn by their constant blows until he lost all his strength, and falling down breathed out his angry soul amid constant groans, and became a prey to the hungry droves of blue foxes which attacked him with their teeth as he lay there still breathing.

While two often fight for an hour, they make a truce, and both lie down near one another, panting to get their breath. When they are recovered they both get up and in gladiatorial fashion take a certain place and refuse to leave it as long as the fighting. continues. They duck their heads and strike back, and one tries to ward off the blows of the other. As long as they are evenly matched they strike only with their front flippers, but as soon as one gets the advantage of his adversary he tears him with his teeth and jaws, shakes him, and throws him down. Then the others, who have meantime been mere spectators, seeing this, hurry up to assist the weaker one, as if they were

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umpires in the fight. With their teeth they inflict wounds as large and cruel as if they were made with a saber. At the end of July a sea bear is seldom seen that is not marked with a wound. After a battle the first thing they do is to go into the water and bathe their bodies.

They fight mostly for one of three reasons: (1) The most bitter warfare is about their wives; trouble begins when one steals those of another, or even tries to take the grown daughters from the father's family. But the females get up at once and follow the one that comes out ahead. (2) They fight for their place

if one takes the place of another, or if the space is too small and another, out of lust, gets too near and excites his suspicion. (3) They fight for right and justice, to settle disputes.
They are very fond of their wives and their young, and are much feared by both. They get in a towering rage with their young for the most trivial causes and practice a tyrants right. Often we entered the harem and stole the pups. In these cases, when flight was possible, if the mother through fear left her pups and did not snatch them up in her mouth and take them with her, but left them where we could get them, the male without entering into any quarrel with us snatched the female up in his teeth, lifted her up high, and threw her in a rage two or three times against the rocks with such violence that she lay still as if dead. But when her strength returned she would crawl like a worm as a suppliant to his feet, and kiss him, and shed tears in such quantities that they ran down on her breast as from an alembic and made it all wet. For a time he would walk back and forth roaring and rolling his eyes terribly, and would shake his head from side to side like a bear; but at length when he saw that we were going to go away with the pups, he would weep in the same way as the female, and just as copiously, so as to flood his whole breast, even to his feet, with tears. The same thing occurs when he suffers grievous wounds or some severe

injury which he can not avenge. I have seen captive seals weep in a similar way.
A second reason why the sea bears in early spring go east to these desert islands is doubtless this. By rest, sleep, and a three months' fast, they must rid themselves of their burdensome fat, in the same way as land bears do in winter. For during the months of June, July, and August, they do nothing except sleep upon land, or lie at ease in one spot like a rock, and look at each other, roar, kiss, and stretch, taking neither food nor drink. One in particular I noticed lying in the same spot for a whole month. Although at different times I dissected the old males, yet I found nothing at all in their stomachs except froth and gastric juice, and no faeces in the bowels. Furthermore, I noted that meanwhile the layers of fat wasted away more and more, the size of the body becoming diminished and the skin becoming so loose that it hung like a sack and swayed with each motion of the body. The younger ones that are not so fat begin to cohabit about the first of July; they are active and run here and there, living on land and in the sea by turns. This fact convinced me still further that in accordance with his nature I should call this animal a bear.
They cohabit after the manner of the human kind, the female below and the male above, and especially near evening time do they desire to indulge their passion. An hour before, male and female cast themselves into the sea and swim around quietly together. Then they come back together, and the female lies flat on her back while the male comes up out of the sea upon her. He seizes her in his arms and indulges his passion with the greatest

heat. During the coition he presses the female down and buries her in the sand by his weight so that only her head sticks out, and he himself digs into the sand with his front feet, so that he presses down and touches the female with his whole belly. For this they choose a sandy spot upon the very shore, where the waves come even to the place. So absorbed are they and so for-

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getful of themselves that I could stand near them for more than a quarter of an hour without being observed. And I should not have been seen even then had I not struck the male a blow, whereupon with a great uproar he attacked me so wrathfully that I got away with difficulty. But nevertheless when I gained an eminence from which I could look down he went on for another quarter of an hour with what he had begun.

These animals have three different kinds of speech. To pass away the time while they lie upon the land they cry out, and their voice is not at all different from the lowing of cows when deprived of their calves. In battle they roar and growl like a bear, and if they get the victory they utter a very sharp and often repeated note like our common crickets. But when wounded and overcome by their enemies they groan terribly or hiss like a cat or sea otter.

When they come out of the sea they shake their bodies and wipe off their breasts with their back flippers, and smooth their fur. The male places the tip of his lips to those of the female as if to kiss her. When the sun shines clear in the sky they lie down and raise their back flippers in the air and move them in the same way as a dog wags his tail. They lie sometimes on their back and sometimes on their belly like a dog, sometimes curled up in a ball, sometimes stretched out on one side with their front flippers resting on the side. But although they sleep soundly, and though a man may approach softly, nevertheless they are speedily aware of his presence and get up, whether informed by hearing or the sense of smell I know not.

The very large old ones never run away from a man or a crowd of men, but prepare at once for battle. Nevertheless, I have seen whole herds put to flight if a man whistle. The females flee in haste, and likewise whole droves of adult males, even many thousands, are driven in headlong flight to the sea, if suddenly, when they feel secure, they are attacked with a great noise. But when, as often, we drove many thousands of them

wonder
upon

before us into the ocean, those that were swimming accompanied us constantly as we walked along the shore, gazing in their unusual
guests.

They swim so rapidly that in an hour they can easily swim two German miles. If they are wounded at sea with a harpoon they draw the boat with the hunter after them so swiftly that the boat seems to fly, and they often overturn the boat and drown the hunter unless the steersman prevents it by watching and skillfully directing his course; they swim with the back sloping, and the front flippers are never seen, but the back ones sometimes project up from the water. On account of the open foramen they stay a long time under water. But they afterwards come up to breathe, with their strength much exhausted; they delight to swim around near the shore and swim now prone and now on their backs, but not far under water, so that I was al-
able to make out their course. They often raise their hind
ways
flippers out of the water. When they have breathed enough, or when they first start into the water from the land, they plunge into the water head first like a wheel, as do almost all the larger the otter, the lion, the balaena orca, and the por-
sea beasts
poise.
When they climb a rock, they take hold of it with their front flippers as seals do, and drag the rest of their body behind them, bending the back like a bow and holding the head low, to give elasticity to the body. In swiftness they almost if not quite excel the swiftest runner, and the females are especially fast. There is no doubt that many of us would have been killed by them if their legs were worth as much on land as they are in water. And, indeed, it is not wise to fight with them even in a large level place, for there one can get away with difficulty. Steep places were always our refuge of safety, because they can not them. They sometimes laid siege to me for more than
climb up
six hours, and at length compelled me, at very great peril of my

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life, to ascend a precipice, and in that way to escape from the infuriated beasts.
If I were required to state how many I saw on Bering Island I should truthfully say that I could not guess they were countless, they covered the whole shore. Not infrequently they obliged me and my Cossack, in our rambles this way and that through the entire island, to leave the shore and prosecute our journey with difficulty over the tops of the hills.
The sea otters are very much in fear of the sea bears, and very seldom come in among them, and it is the same with the seals. But the sea lions live among them in great herds and are much feared by them. They always have the best places. The sea bears do not like to stir up quarrels when the sea lions are pre-
sent for fear they have these savage beasts as umpires; for they run up immediately, as I have sometimes seen. So also they dare

not try to prevent their females from playing with the sea lions. And, by the way, this is a curious fact, that the sea bears are not found everywhere on the shores of their islands, as are the sea cows, the seals, the otter, and the sea lions, but only on the southern shore, which faces Kamchatka. The reason of this is obvious for they see this part of the island first when they come on their journey eastward from Cape Kronotski. They are not found in the northern part unless they have strayed there by mistake.

Now about the hunting of these animals. Those that we first blinded on land with stones were afterward dispatched with clubs without any artifice. But the beasts are so tenacious of life that two or three men beating only their heads with clubs could scarcely kill them with 200 blows, and frequently would have to rest and refresh themselves two or three times. When the cranium is broken into little bits and almost all the brains have gushed out, and all the teeth have been broken, he still attacks them with his flippers and keeps on fighting. I have purposely broken the skull and put out the eyes of one and then left him,

and afterwards for more than two weeks he still stood alive and unmoved, like a statue, in the same place.

In the sea around Kamchatka they very seldom come ashore on the mainland, but they are wounded at sea by the natives with an iron spear called "nosok" which detaches from the handle and remains in the body, and this iron part of the spear, because
inside it is oblique to the wound, sticks fast. It is bound to a stout thong, the other end of which is held by those sitting in the boat. But the wounded animal flees very swiftly like an arrow, and takes the boat and men along with him, until he pauses, worn out and exhausted with loss of blood. As soon as he pauses they draw him up to them by the thong and pierce him with spears, and if he attempts to upset the boat they crush his front flippers and his head with axes and clubs, lift him dead into the boat, and hasten home. By preference in spring they kill the pregnant females and the young males. But they dare not attack the large, old males, but when they see one they say "Sipang" (the devil), for they mean by that to call the big fellow evil and destructive. So likewise they say if they see a sea lion or a very large sea bear on land when they have no companion or weapons.

Very many sea bears die a natural death from old age on this island every year, and as many more fall in battle and die from the wounds that they have received; so that in some parts the whole shore is covered with bones and skulls, as if great battles had been fought there.

up

I can not omit to mention that these animals have a very large thymus gland, composed of many little glands, and rolled in a membranous sac. I have made an incision into a branch of the main artery of the lungs, and when I inserted a little tube

and blew in with my mouth I discovered that not only the ventricles of the heart but also the thymus gland swelled up. I would rather not suggest what others may conclude in regard

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to this, unless I could make many more experiments on other sea beasts.
Here, at the end, I will mention that it is a very curious thing what the explorer, Dampier, says of the Island Ferdinand (Juan Fernandez), below 36° south latitude, he asserts that there upon the land he found the whole shore covered with countless herds of seals, sea lions, and sea bears, in the same way as we found it in Bering Island. This does not lead me to believe that these animals come hither from those Southern latitudes, for this distance would be far too great, but I gather from it two facts: first, that the sea beasts of the southern hemisphere are the same, or not very different, from those of the northern in about the same longitude; and, second, it is credible that our sea bears spend the winter at about the same degree of north latitude. Perchance some time fate will grant that since we have found their summer camping ground others may somewhere discover their winter home; if this be not the land called "Compagnie land' perchance it may be a land lying not far away and some time to be discovered.
I have had two pictures made, of which the former represents a male resting on a rock, as they are generally seen; and the second, a smaller female lying upon her back. I have her represented in this position chiefly for the reason that the shape of the hind leg may appear, and this could not be brought out true to nature if she were in sitting position. '
As to style and arrangement of matter, pressure of duties does not permit me to spend too much time in perfecting any one thing, unless I am to allow many things to go to waste upon my hands. I therefore set out my porridge in carefully made earthen vessels. If the vessel is an offense to any one, he will perform for me and others a most friendly service if he will pour it all into a gold or silver urn. As to the fact that I have noted the minutest circumstances, I did it for this reason: that I might omit nothing that I learned from careful watching. For the rest, I guarantee that I say nothing that is not most true; an account can always be made shorter, but not longer or fuller, if it has been from the outset restricted within rather narrow limits.
'Tab. XV, online at http://dz-srv 1.sub.uni-goettingen.de/sub/digbib/loader?ht=VIEW&did=D151405

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THE SEA LION'

Description of the beast of the sea named by Dampier the sea lion, by the Kurils, Kamchatkans, and Russians "Siwutscha." Described on Bering Island the 20th of June 1742.

Habits and characteristics

These beasts are indeed terrible to look upon when alive; and they far surpass the sea bear in strength and size as well as in endurance of the different parts. They are hard to overcome and fight most viciously when cornered. They also give to the eyes and mind the impression of a lion. Nevertheless, they fear so much the very sight of man that if they see one even at a distance they rush in headlong flight from the land into the sea. But if, when they are sound asleep, a man comes up near and wakes them by a blow from his stick or by a loud noise) they take to flight at once, panting like a furnace, and with their limbs shaking so with fear that they can not control them. But if one of them is cornered and all chance for flight is shut off he turns against his enemy with a great roar, shakes his head in wrath, rages, cries out, and puts even the bravest man to flight. The first time that I tried this experiment was almost the last of me. On this account this animal is never hunted at sea by the Kamchatkan tribes, because he overturns the boat of the hunters and slays them most savagely. Nor does anyone dare engage

'The Miller translation omits 2 pages of introductory description.

him even on land in open battle, but he is caught by guile when off his guard and quite at ease, or even sound asleep. When the beast is asleep on land, the hunter who has most confidence in his strength and swiftness, creeps silently up to it with the wind in his face and plunges into it under its fore flippers an iron or bone spear called a "nosok." It is made to fly out of its socket and is fastened to a thong made from the skin of this very animal. The other hunters keep the thong, which is wound several times around a rock or a stake driven deep into the ground. While the beast that has been wounded and aroused attempts to get away, the other men shoot arrows at it from a distance, or transfix it with a second spear fastened to a thong. At length when its strength is gone they pierce it with spears and kill it with clubs. But when they attack it they attack it asleep on the shore where there are few rocks; they shoot poisoned arrows, and then run away. The animal is compelled by the poison to come on shore, as the salt sea water increases the pain of the wounds; and then, if the place is a convenient one, he is stabbed, or otherwise, if left to himself, he will die of the poison in twenty-four hours. All who have the skill and daring to hunt this beast, and who have killed many, are held in great honor by their fellows, and are regarded as heroes and braves. Accordingly the love of glory, as well as the excellence of the flesh, turns many to the hunt and makes them ready for hazardous enterprises. They often load their boats with two or even three of these animals, till they threaten to sink in the water. But they are so skillful that this seldom happens in the smooth sea, even

though the rim of the boat may be even with the surface of the water. They consider it a great disgrace if, through fear of
they have once secured, so
death, they abandon the quarry that
that if their hands should not avail to bail out the water they would sink. To hunt this beast the bravest men go out to sea in their light canoes four or five German miles to the uninhabited island called Alait. And it not infrequently happens that the

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sailors without a compass are taken by a contrary wind four, five, or even eight days out to sea without anything to eat, and see neither island nor mainland, and have only the rising and setting of the sun and moon to direct them.

The blubber, as well as the sweet flesh, is well flavored and highly prized, and the gelatinous flippers are considered a prime delicacy. The fat is not greasy, like that of seals and whales, but is stiff, and resembles that of sea bears in color, but not in flavor and smell. The fat of the young is sweeter than mutton tallow and resembles the marrow of leg bones. From the skin they make thongs, the soles of shoes, and even shoes themselves and leggins.

They are polygamous. One male has two, three, or four females. The pups are born on land about the beginning of June - one only at a birth, and are suckled by their mothers. They come together in August and September, hence the young remains in the womb nine months, as indeed seems reasonable. They copulate like the sea bears. The males hold the females in great respect and do not treat them so harshly as the sea bears do their wives. They delight exceedingly in the caresses of the females and count their affection worthy of much more demonstrative return. The males, like the females, have a very indifferent love for the pups. The mothers when asleep sometimes crush the young at their udders by their weight and kill them, as I have often seen, and they were not the least bit disturbed when, as often, I cut the throats of the young, even before the eyes of their parents and threw the entrails to them. The pups are not so lively and active as those of the sea bears, but sleep all the time or play a little in a lazy way, and indulge in amatory sports. At eventide the mothers with the young go out into the sea and swim quietly near the shore. When the pups get tired of swimming they are wont to perch upon the backs of their mothers and rest. But the mother rolls over like a wheel and shakes the lazy pups off, and accustoms them to swimming. As an ex-

periment I have thrown young sea bears and equally young sea lions into the water; but they were so far from being able to swim or to use their flippers well that they beat the waves irregularly with their flippers and hurried to the shore. The pups

are twice as large as those of sea bears.
Although these animals are exceedingly afraid of man, yet I have seen them grow used to him and become tame by meeting him frequently without injury, and especially at that time when had not yet learned to swim easily. I lived a season in
the
pups
the midst of a herd of them, and for six whole days on a spot above them, where from my hut I watched their habits carefully. They lay around me in every direction; they watched my fire and what I did, and did not run away any longer even when I walked around among them and took their pups and killed them and examined them. They practiced coition, fought jealously for their wives and for the best places, and fought most bitterly in and with the same motions and the same heat
just
the same way
as the sea bears do. One from whom a female had been taken fought with all the rest for three whole days, and was wounded all over in more than a hundred places. The sea bears never mingle in their fights, but if a quarrel arises they run away, looking all around them. They yield them the choice of places and allow their females and pups to indulge in various sports, and dare not object. As far as possible they avoid all dealings with the sea lions, but these, uninvited and unwelcome, often mix in their quarrels. The old and decrepit among them
grow
white around the head, and beyond all doubt these beasts are very long-lived. They scratch their ears and head with their hind flippers, as the bears do, and stand, swim, lie down, and walk in the same way. They low like cows and the young bleat like sheep, and while I was among them it seemed to me as if I were playing shepherd and were mingling with herds of cattle. The old and worn-out emit an odor, but far milder and less offensive than that of the sea bears. They are found in this island

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in spring, as well as in winter and summer, but only in certain parts those that are rocky and near precipices. Nevertheless, others come here every year along with the sea bears. I have seen them in great numbers along the American shores. They are found in Kamchatka almost all the time. They do not go above 56° north latitude. They are hunted a great deal near Cape Kronotski and around the island Ostrovnaia, around Avatcha Gulf, and from here as far as Cape Lopatka. They are found in the Kuril Islands and almost as far as Matmej Island. Captain Spangberg on his chart has named a certain island from the number of these animals that he found upon it, and from a cliff overhanging their city, the "Palace of Sivutch." The sea lion

is never seen in the Penshin Sea. The reasons why these beasts come hither in June, July, and August, are for quiet, for parturition, for rearing and teaching the pups, and for copulation. Before and after this period they are found in greater numbers on the shores of Kamchatka.

As to the food of these beasts, they prey upon fish and seal especially, and also upon otter and other sea animals. The old ones eat little or nothing at all in June and July, but take their ease and sleep, and at the same time become very thin.

THE SEA OTTER'

Habits and Characteristics

These animals are very beautiful, and because of their beauty they are very valuable, as one may well believe of a skin the hairs of which, an inch or an inch and a half in length, are very soft, very thickly set, jet black and glossy. The soft underfur also among the longer hairs is black; but the tips, or the hairs from the middle on, are black, while the bases or roots are whitish, lustrous like silk, and silvery. The most valuable skins are almost perfectly black; others are found with silvery fur shining quite white all over, but they occur very rarely. Although as time goes on they change the color of their hair, they are still much more constant than the sables, and sable skins never shine with so deep a natural blackness as the otters. The one thing to be deplored is that the skin is too thick and heavy, and for that reason is less pleasing to the eyes of the gentler sex; for the skin of an adult otter weighs, on an average, 3½ pounds.

Rarely is an otter caught that is black all over; the head of the best grade of otters is silvery gray; the cheaper grade of otter has a head of a tawny color and yellowish fur; and the lowest grade of otter is that which has no long hair, and is clad only in short, dirty-gray fur. With these animals matters stand like

'The Miller translation omits 15 pages of measurements and descriptions of the external and internal parts.

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this: the skins of certain animals always grow red hairs, rarely very long, while the animals themselves are stupid, sluggish, surly, sleepy; they lie forever asleep upon the icy rocks; they move slowly, and can be captured without any painstaking or ingenuity, as if they knew that because of the inferiority of their hides they were not very seriously exposed to death. Many of them, however, have most beautiful tails, covered with long, black fur. From these considerations I have come to two conclusions. (1) That the skins of sluggish animals are overgrown with only short hair, for the simple reason that in summer time, while they roll about in the sand, the longer hairs are worn off by the constant friction, and in the winter, while they lie upon the damp ice, the longer hairs stick fast to the ice, and are pulled off when the animal moves. This I have seen with my own eyes.

(2) That black hair, through the influence of air and sunlight, grows lighter and feebler, and so the tail, as it is curled under the lying animal, is less exposed to friction and to the rays of the sun, and so preserves the original blackness and length of hair. The more active and cunning and fleet the animals are, the more beautiful is the fur with which they are covered, and again, unlike the others, they are captured but rarely, and that only by well-laid snares. Such animals are so careful about their own safety that if they come out on dry land alone to sleep, they look around very carefully, and, inasmuch as their eyes are not very strong when on land, they turn their noses in every direction before they go to. sleep, to make sure that no man is in the neighborhood and then, even though they perceive no sign whatever of danger, they do not get far away from the sea. They often wake up with a start, look around, and never sleep very soundly. But if whole herds sleep together on the land, the finest looking leaders [of the herd] stand on sentinel duty, and arouse the rest if any danger threatens.

The skins of females can be distinguished from those of males at the very first sight, because they have shorter, finer,

more beautiful hairs on their backs and longer ones on the belly; the flesh of the females is more tender, more savory, and more delicious because of the distribution of the fat. In the former respect they are different from quadrupeds and birds, for in these classes it is the males that are covered with the more beautiful hair and feathers and the brighter colors.

They do change their hair, however, like land animals and birds, but with this two-fold difference: some lose their hair in the months of July and August, but they lose very little of it; the others change their color somewhat and come out a darker gray, and are for that reason called by the Russians and merchants "Letnie Bobry," and are sold at a smaller price. The most prized skins are those which are taken from animals in March, April, and May.

The adult males are called "Bobry," the females, "Matka," and the one-year-olds, which have taken on the soft, short fur, "Koschloki"; the cubs are called "Medviedki," or "little bears," because they have very long, thin, tawny hair like bears; their skins can scarcely be distinguished from the skins of the young bear, but after five months they lose their hair, and then they are called "Koschloki," as intermediating between the cubs and the one-year-olds, and are then covered only with soft, downy fur.

Upward of fifteen years ago, the finest skins were exchanged by the natives in the land of Kamchatka for knives and firearms, and were sold by Russian merchants for 5 or 6 rubles; those of medium quality sold for 4 rubles; those from the Yakut sold for 8 or 10 rubles. But ever since the Chinese began to appreciate and earnestly to covet these wares the finest skins of the adult animal were sold even in the land of Kamchatka for 25 and 30

rubles; those of medium quality for 17, while 1-year-olds (those called "Koschloki") brought 8 rubles, and cubs 1 ruble. Tails were held at a particularly high price, and were purchased for 1½ or even 2 rubles, and were much sought after for caps and mittens.

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Very few are brought to Russia; almost all are taken to China, where the best ones command a price of 70 and 80 rubles. In 1735 and 1736 they were quite ready to offer 20 rolls of "Kitaika" for one skin, while the Russians on their return to Irkutsk obtained for it 100 rubles.

These skins, moreover, being rather heavy, are for that reason dearer to the Chinese than the skins of sables and foxes, and they are better suited to increase the weight of the too light silk gowns. In addition to their beauty they make the silk fit more closely to the body and resist the wind better; and for those reasons the Chinese make of this fur borders of a hand's breadth and put them around their robes on every side; and this has become the fashion also with both sexes, not among the tribes of Kalmuc and Siberia only, but also in Russia. In the land of Kamchatka nothing is considered a finer adornment than a dress sewed up like a sack (a "Parka" they call it), made out of the white skins of reindeer fawns (called "Püschiki") and having a border of sea otter fur around it. Mittens and caps are also made of sea otter fur.

In addition to their weight, these skins have also this disadvantage, that they retain too little heat about the body and become moist, although, because of their thickness, they do afford excellent protection against the violence of the wind.

gone out

Up to a few years ago the people there also used to make their clothes out of those skins, as they did long ago out of the skins of foxes and sables (Zobelae), but that custom has of date now that their value has increased so much, and they are not very much aggrieved at that change of fashion, for the people there have always looked on dog skins as warmer, more beautiful, and more lasting.

The hides of the cubs have this advantage, that they heat the body less than fox skins do.

These animals are captured only on the shore of Kamchatka, from 50° to 56° north latitude. They are never seen in the Pen-

shin Sea, nor are they observed to go beyond the third Kuril Island. From this fact, and from the hunting of the animal, the ocean from the neighborhood of Lopatka to the Promontory of Kronotski has received the name of "Bobrovi Sea." For a long time back it has been believed by the people, as well as by Russians, and asserted that this animal is not an Asiatic, but a

stranger in that region and a foreigner from other lands that lie quite near Kamchatka, where they are taken every year. When the east wind blows for two days together in the winter time, they are floated over with the ice on which they have been lying, and so are caught. Those which escape death in the winter stay in the summer about the rugged and rocky shores of Kamchatka and the Kuril Islands, give birth to their young, and remain there; for they have not the strength to swim
away, and,
on account of the foramen ovale of the heart, they can not while swimming over the sea seek their food in its depths; neither can they hold out against hunger for three or four days.

The hunting of the otter is on this wise: if the winter has
been cold and great quantities of ice are repeatedly blown over, there will be an abundance of sea otter not only in winter, but also, from those that survive, in the summer; and, on the other hand, from the year 1740 to 1748 there was no cold weather in this locality, no ice could be frozen about the shores and brought over there, and so the otter were few and the hunting exceedingly limited.

The region famous for the hunting of the otter twenty years ago extended from the mouth of the Kamchatka to the Tchaschma, and was more renowned for that than any other place; now, however, it is but little and rarely used. Hunters numbers about the Promontory of Kronotski,
came in greater
which has come to be most frequented next after the mouth of the river Kamchatka; but there also the catch has grown smaller. About Ostrovnaia, the Gulf of Avatcha, the Promontory of Lopatka, and the first three Kuril Islands they are now

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caught in much greater numbers than before. The Penschin Sea they do not enter, although crabs and other shellfish are to be found there in at least as great if not greater numbers than on the Kamchatkan shore. But why they do not go beyond the first three Kuril Islands, although they might easily pass from one to the other and so on clear to Japan, admits of a three-fold explanation. (1) Because the sea lions and sea bears, inhabiting the desert islands in very great numbers, devour the sea otter and injure them in every possible manner, the latter are very
much
afraid of them and are driven away. (2) There is never any ice in those regions, and so no sea otter are ever brought. (3) The distance between America and the farther Kuril Islands is very great, and there are no islands in between, and so these animals cannot reach them by swimming. Besides, these creatures are not naturally of a roving disposition but if they might find a suitable place designed, as it were, for them, even so the inhabitants of the first islands are so bent on hunting them that those

which have managed to escape in winter rarely escape in summer. They hunt the otter in all seasons, but in most diverse manner according to the demands of the season. They are captured in greatest numbers in winter, particularly in the months of February, March, and April, but their capture is made at the expense of tremendous exertion, great daring, and not infrequently loss of human life. When in the months before mentioned the east wind blows for two or three days in succession, a vast quantity of ice is carried over from the American shore; the ice comes over even more quickly if it has been carried away in the autumn and held in the channel between the islands. While the wind blows, the hunters lie in wait in their straw-covered huts; the ice drifts in in so great quantities that it fills the surface of the sea for several miles out from land in the region of the Kuril Islands, and oftentimes connects the Promontory of Lapatka with the first island. Then the hunters, arming themselves with clubs and knives, put on their snowshoes (called

"lapki"), and either alone or attended by dogs go out upon the ice. With their clubs they kill the otter they find in a few moments, moving continually the while that they may not break the ice. They have the skins carefully pulled off, and leave the carcasses, if they be too far from the shore. Meanwhile the dogs hunt out others. When the otter catches sight of the dog and the dog stops, the otter is brought terrified to bay, and attempts to hide, until the hunter, following the footprints of the dog, comes upon his quarry and dispatches it. So eagerly do they pursue the hunt that they often go out so far upon the ice that they get out of sight of land.

If, as often happens, the ice is brought in with a gale or tempest and a heavy fall of snow, the catch, is even larger, but fraught with greater danger, for when the hunters can not look ahead nor see the holes in the ice at their feet, they must follow their dog or mere blind chance. This most venturesome chase can not be witnessed from the land without terror. The ice rises and falls with the waves; the hunters walk now upon a mountain which was but a moment before a valley or a deep pit; again they are lifted up on high, and again they sink and disappear from sight. But the best and easiest hunting takes place when the ice remains on the shore for a long time; for while the tempest lasts, the otter, not knowing whether they are on the floating ice or on the land, go inland 5, 10, and even 15 furlongs. For they are misled by the roaring of the wind in the trees and bushes and think they are going toward the sea, and that what they hear is the roar of the waves. In this way a single huntsman often kills as many as thirty or forty or more, and saves the meat as well as the skin.

While the people hunt upon the ice, they are generally very careful to observe the winds, for fear that by adverse winds they be carried, as not infrequently happens, out into the open sea. It is not a rare thing for them to float up and down with the ice the waves for three, four, five, and even six days, and then,

upon

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with favoring fortune and favoring winds, to be brought in again and come safely to shore. When the wind blows from the quarter the ice is drifted away. If it drifts along the shore, the hunters follow the ice continually, for while the ice is drifting away, whether by day or by night, the otter try to get back upon it again, and so the latter part of the hunt is often richer than the beginning. The hunters wear snowshoes, in order that the ice, which is often very thin, may bear their weight, and keep them from breaking through. Each shoe is from 5 to 6 feet long, 8 inches wide, and is fastened to the foot with straps.

As this hunt takes place upon the ice, it is considered good news all through the Kuril Islands, Lopatka, Kronotski, and Avatcha that the ice has come. Moreover, besides the otter, seals also and sea lions are brought in upon the ice.

The hunting of the otter is planned for in the winter time, because the colder, windier, and stormier the winter the greater the catch, and the milder the winter the poorer the catch. Although in the years 1740, 1741, and 1742 great quantities of ice with great numbers of otter drifted in, still the catch was very insignificant; but the reason was that the ice was very thin and would not hold the hunters.

In summer the otter are caught in four ways. (1) While lying upon their backs asleep at sea they are speared from boats with harpoons. (2) Even when awake they may be driven about in the sea by two boats until they are tired out and then speared, for they can not live underwater for more than two minutes without breathing. If pursued moderately, therefore, they swim along and soon get so out of breath that they can flee no farther and are forced to stop. (3) When the tide is out they take refuge on the rocks that rise up above the surface of the sea. There they sleep and are killed by the hunters with clubs. Before the advent of the Russians they used in the same way to come out on land to sleep on the shores of Kamchatka and the Kuril Islands; but ever since they began to be hunted for their skins to

satisfy the avarice of man they are never caught upon the mainland, or very rarely, when they have come there unaware. (4) They are caught in nets. The nets are spread above the water and tied with stones to hold them firmly in position in not very deep places, where sea weed grows in great quantities, for the otter feed upon shellfish and crustaceans that live concealed in the sea weeds, and there they are caught in the nets or are killed by the hunter, who comes upon them in his boat. Sometimes they carve out wooden otters, paint them black, and set them afloat. The otter, seeing these images, swim up and in-

dulge in various strange capers about them, and by this trick are caught. When they are caught in the nets they are so frantic that in their despair they bite off their front feet, but if a male and a female are caught together they both lacerate their skins terribly and knock out their eyes.

We killed them on Bering Island with spears, nets, and, when they were lying asleep or in the act of copulating, with clubs.

They were found there in so great abundance that from the beginning our numbers did not suffice to kill them. They covered the shore in great droves, and as the animal is not migratory, but is born and bred there, they are so far from fearing man that they would come up to our fires and would not be driven away until, after many of them had been slain, they learned to know us and run. away. Nevertheless we killed upward of 800 of them, and if the narrow limits of the craft we constructed had permitted we should have killed three times as many.

As to the beauty of the animal, and particularly of its skin, this sea otter is alone incomparable, without a peer; it surpasses all other inhabitants of the vast ocean, and holds the first rank in point of beauty and softness of its fur.

As to its habits, it loves to live both in the water and on the land, but for the sake of sweet peace the otter inhabits in great

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droves, by preference, the great islands of the ocean. For getting food it seeks, when the tide is out, the shallow, rocky reefs overgrown with seaweed, and there devours crustaceans, mussels, clams, snails, limpets, polyps, cuttlefish. Only when forced by hunger to do so, do they eat seaweed, but they eat fish, smelt, and a little fish called in Kamchatkan idiom the "Uiky," which is washed in by the spring tides in countless numbers. They are also fond of meat, I have seen an otter eating the flesh of another otter which had been skinned and thrown away. It may therefore be concluded that this animal is omnivorous.

In the winter they lie some upon the ice, some upon the shore. In summer they go up the rivers and penetrate even to the lakes, where they greatly enjoy the fresh water. On warm days they seek the valleys and shady recesses of the mountains and frolic there like monkeys. They surpass all other amphibia in play and frolicsomeness, and in fleetness of foot.

up.

As

On the land they lie, as dogs do, with the body curled

they come out of the sea, like dogs they shake off all the water before they lie down to sleep; then with their paws they wash their faces, just as cats do, smooth out their bodies, straighten out their fur, turn their head from one side to the other as they look themselves over, and seem to be greatly pleased with their

personal appearance. I have also seen the males play with their genital organs like monkeys. When they are engaged in sleeking their fur they are so intent upon it that they can be killed readily.

A swift runner can scarcely overtake an otter when it runs, for it runs with many windings, in a fashion to mislead. When it sees its path to the sea intercepted and finds itself exhausted and out of breadth, it puts up its back like a cat, threatens to leap upon its pursuer, and spits like an angry cat, but we, being conscious that its anger was not dangerous, were not frightened off; and when it receives a vigorous blow upon the head it falls upon the ground, covers its eyes with its paws, and keeps them

so, no matter how many times it is struck upon the back. But if one hits it on the tail, which is extended out as the animal runs, it turns about and faces the striker in the most absurd fashion. But more frequently it happens that they fall down at the first blow and pretend that they are dead, and then as soon as they see that we turn our attention to others they suddenly take to flight. From this it would appear that the animal is very cunning. Oftentimes we would drive them into narrow places on purpose, without any thought of doing them any harm; we would hold our clubs ready, and they would fall down fawning and looking around in every direction. Then they would slowly slink past us like dogs, and as soon as they saw that they were out of danger they would hurry with mighty leaps to the sea. When they stand up they keep their necks extended in line with the body, and the hinder part, because of the length of the legs, stands higher.

They swim now upon the belly, now upon one side, and
again flat
the back; they also swim standing bolt upright
upon
in the water.

They play together, and, like human beings, embrace with their arms and kiss each other. If they escape the club, they gesticulate in a very ridiculous manner, as if making fun of the hunter. With one paw raised over their eyes, as if bothered by the rays of the sun, they watch the man, continually rubbing their pudenda as they lie upon their backs, and then go off into the water, still watching the man steadily and urinating as they go, in the same way as sea bears and whales also do.

year

They copulate at all seasons, and so throughout the the mothers are seen busy with their cubs. Whether they give birth twice within one season I would not venture to decide; but I have seen, and I have sometimes killed, mothers with two cubs, one of which was a year old and the other three or four months old. So much is certain, they never, or at most very rarely, give birth to more than one at a time. The first year after they are

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born they do not copulate, but the second year they do. The period of gestation is eight or nine months; and so they bring forth perfectly developed young, with eyes open and with all their teeth; the four canine teeth are smaller than common, just as I have observed, also, in the case of the sea bears, seals, and sea lions.

They suckle their young almost a whole year. They preserve their conjugal affection most constantly, and the male does not serve more than one female. They live together both on sea and on laud. The 1-year-old cubs, the "koschloki," live with their parents until they set up housekeeping on their own score. Barely, therefore, are females seen apart from cubs two or three months old, which are called "medviedki."

in

The females always give birth to their young on land. Whether in the sea or on land, they carry their cubs in their mouths; but when they sleep at sea they fold their young their arms just as mothers do their babes. They throw the young ones into the water to teach them to swim, and when tired out they bring them to shore again and kiss them just like human beings. They toss the young out into the sea and with their paws catch them when tossed, like a ball; and with them they engage in all the delightful and gentle games that a fond mother can play with her children. When the mother sleeps on shore the cubs keep watch, clinging to her dugs or arms. They embrace their young with an affection that is scarcely credible. When hunters press upon them, whether by land or by sea, they seize their young with their mouths and never let go of them except when compelled by extreme necessity or death itself. And so they are killed often when they might have got away themselves. I have sometimes deprived females of their young on purpose, sparing the mothers themselves, and they would weep over their affliction just like human beings. I once carried off two little ones alive, and the mothers followed me at a distance like dogs, calling to their young with a voice like the

wailing of an infant; and when the young ones heard their mothers' voice they wailed, too. I sat down in the snow and the mothers came close up and stood ready to take the young ones from my hand if I should set them down in the snow. After eight days I returned to the same place and found one of the females at the spot where I had taken the young, bowed down with the deepest sorrow. Thus she lay, and I approached without any sign of flight on her part. Her skin hung loose, and she had grown so thin in that one week that there was nothing left but skin and bones. This happened several times in succession. It happened one other time that, in company with Mr. Plenisner, I saw in the distance a mother otter sleeping with a year-old cub. When she caught sight of us the mother ran to her off-

spring, woke him up, and warned him to flee; but, as he preferred to go on sleeping rather than to run away, she picked him up in her paws in spite of himself and rolled him like a stone down into the sea.
On land they can not see very well, but their sense of smell is very keen. They ought, therefore, to be hunted from the lee side. Their sense of hearing is just as sharp.
The cry of the sea otter is very like the cry of an infant. They doubtlessly live many years. They never breed strife among themselves, but always live on the best of terms with one another. They are very much afraid of sea lions and sea bears, and they do not like the company of seals. Accordingly the places which those animals frequent are carefully avoided by the otter.
The flesh of the adult otter is much more tender and savory than that of the seal. The flesh of the female is best, for it is fatter and more tender, and the fat lies between little membranes. It is for that reason a little hard. In the case of pregnant mothers, the nearer they are to parturition the fatter they are. In this respect they are different from land animals. The flesh of the young otter is most delicious; it can not easily be distinguished from the flesh of an unweaned lamb, whether roasted or boiled,

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and the gravy from its preparing, in either way, is most delicious. Otter flesh was our principal food on Bering Island; it was also our universal medicine. By its use we were saved from scurvy, and no one got sick of it, although we ate it every day half raw and without bread. The liver, heart, and kidneys tasted exactly like those of the calf. The natives of Kamchatka and the Kuril Islands give the first preference to the flesh of eagles, the second to otter's flesh. The liver and kidneys they eat raw, and declare them most excellent. Not only the natives but also the Russians use scrapings from the bony base of the penis as the proper remedy to cure the tertian fever.
The skins go through the following processes before they are ready for use. (1) After the skin has been taken from the animal shreds of muscle are cut from it with a knife. This process the Russians call by the Slavonic term, "bolon sniat." (2) Then the skin is stretched to its utmost; for, besides the fact that the price increases with the size, the skins thus prepared become lighter, although the fur does become less beautiful. (3) After this they straighten out the hairs with bones from the wings of gulls, and sleep upon them, naked, for several weeks to make them glossier, nicer, and more beautiful. This process the Russians call "vyspat bobr." (4) While the Cossacks are getting the skins from the natives they frequently beat the skins upon the snow with sticks, and if the fur is gray, or any other color than black, they color them with alum and empetrum berries cooked to the proper consistency with fish oil. This makes them glossy black. But the fraud can be detected pull out of a dyed

skin a single hair and it will show three colors: at the end, the black of the dye; from the middle down, the native color; and, finally, the base of the hair.
While the skins are being prepared for use, the natives treat them also as follows: they smear the inside of the skin with a powder made of dried fish eggs, as the Rutheni do with simple yeast; then they roll it up and lay it away for several days, and

after that they scrape it with shells and glass, and finally smooth it down with pumice stone. During this time they knead the inside with a wooden hook and with the hands until it grows soft with the fermented dough of the fish eggs and all the fat disappears and the skin comes out soft and pliable. All other skins which are sold to traders are exported without any preparation, for it has been observed that these undressed skins keep their native color better.
I have wished to report about the sea otter what I have seen as an eye witness, and also what I have heard from the natives, in hunting them.
I have had two pictures made: Fig. 1 (Tab. XVI) represents an otter walking upon land, fig. 2 represents one swimming with her cub in the water.[1]
1 Tab. XVI, online at http://dz-srv 1.sub.uni-goetungen.de/sub/digbib/loader?ht=VIEW&did=D151406

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Steller's Sea Cow (Hydrodamalis gigas)

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DE BESTIIS MARINIS
Photographs from U.S. Fish & Wildlife Service Digital Library System.
Northern fur seal (Callorhinus ursinus)
ILLUSTRATIONS
Steller's Sea Lion (Eumetopias jubatus)
Photo: Forrest B. Lee
Photo: Tom Early
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DE BESTIIS MARINIS
Sea Otter (Enhydra lutris)

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NOTES
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University of Puerto Rico, Mayagüez
Shedding Light on the Luminous
Lizard (Proctoporus shrevei) of
Trinidad: A Brief Natural History
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ABSTRACT. A herpetological debate lasting nearly 70 years regarding the so-called luminous lizard, Proctoporus shrevei, of Trinidad is addressed. Published natural history accounts from the 1930s suggested that males of the species possess the capability of producing light. Despite the potential significance of such a trait in a terrestrial vertebrate, no direct studies of P. shrevei were conducted and findings from indirect studies were equivocal. To resolve the debate, a field investigation was conducted in May 2001 and 2002 with adult P. shrevei in Trinidad. Evidence supported the hypothesis that the lizards' scales are highly reflective and, when combined with fluctuations in dermal pigmentation, this produces an optical illusion consistent with early natural history observations. No evidence for bioluminescence was found. However, despite being a tropical organism, P. shrevei displays intolerance to heat and life history adaptations to relatively cold, cave-entrance microhabitats.
KEYWORDS. Teiidae, Trinidad, bioluminescence, thermal ecology, ectothermy.

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In March 1937, naturalist Ivan Sanderson collected specimens of the teiid lizard Proctoporus shrevei from cave entrances near the summit of Mt. Aripo in Trinidad, West In-

dies (Sanderson 1939). Males of this small, cryptozoic species (Fig. 1) are dark brown with a series of white lateral spots, each surrounded by a ring of black pigment (Parker 1935; Murphy 1997). These markings became the source of controversy when Sanderson described them as being luminous. As Sanderson (1939) recounts, '...in a crevice beneath a ledge I saw a dim light which promptly went out. I flashed the torch in and there was a small lizard. Putting a net over one end of the cleft, I tickled [the lizard], but instead of running out, it turned its head away from me and both sides lit up for a few seconds like the

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FIG. 1. The luminous lizard, Proctoporus shrevei, from the summit of Mt. Aripo, Trinidad. Photograph by: Mike Knight.

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(1939) concluded that the translucent ocellar scales may have some connection with light and suggested three alternative hypotheses related to light production by the lizard:

1. Light is produced by an intracellular chemical reaction of some substance such as luciferin,
2. Light production occurs through phosphorescence,
3. The unique scales of P. shrevei are not luminous at all, but rather highly reflective.

Because Parker's evaluation was based on preserved specimens and not living lizards, no empirical evidence could be obtained to support or refute Sanderson's claim that the P. shrevei is capable of producing light. Roth and Gans (1960) re-evaluated reports of the luminous lizard, providing a detailed examination of the histological structure of the ocellar scales from related species and citing unpublished observations by various biologists and naturalists. No evidence was found to suggest that P. shrevei or any related species is luminescent, however, Roth and Gans never made direct observations of P. shrevei specimens. Their conclusions, based on hearsay anecdotes and studies of related species, left the controversy surrounding P. shrevei unresolved. Most recently, the luminous lizard received further attention when it was featured in a popularized television documentary (produced by Discovery Communications Inc., 1999). This program sensationalized the search for P. shrevei in the mountainous rainforest of Trinidad. Following the capture of a single specimen, the

documentary showed the lizard, in a darkened room, with what was claimed to be glowing ocellar scales. No scientific investigation was conducted, but the documentary rekindled the debate as to whether P. shrevei is actually bioluminescent.

To resolve nearly 70 years of herpetological debate, an investigation was conducted in May 2001 and May 2002. Two male P. shrevei were collected from rock crevices containing abundant damp leaf litter, near a cave entrance at the summit of Mt. Aripo, Trinidad (elevation approx. 940 m), Sanderson's original site of discovery. After initial examination in the field, specimens were transported to a station in Arima, Trinidad for further observation. Lizards were studied under light and dark conditions at different times during the day to test Parker's (1939) hypotheses of light production. These observations were compared with notes (Quesnel, personal observations) on a third lizard previously held in captivity. Neither field nor lab observations revealed any light emission from the ocellar scales of P. shrevei, thus eliminating the possibility of chemical light production. To test the hypotheses that the ocellar scales are phosphorescent or reflective, high-intensity light from a xenon lamp was directed at the lizards from varying angles. No light was emitted by the lizards, indicating that P. shrevei is not phosphorescent. However, light was clearly reflected by the lizards' scales, providing support for Parker's reflectivity hypothesis. We found that if P. shrevei is observed along the same plane from which light is directed, the normally obvious white ocelli cannot be seen against the reflection from all other scales. But, when viewed from an angle oblique to the light source, the ocelli appear brighter, while surrounding scales show no reflection. By varying the angle of reflected light, an illusion is created that the ocellar scales are intermittently emitting light, thus providing an explanation of Sanderson's original account of the lizard "switch [ing] on its portholes." The illusion produced by the reflective scales also explains recent accounts, as well as Sanderson's description of the white ocelli "remain [ing] plainly discernable in a darkened box when the rest of

the animal was invisible." The ocellar scales reflect and intensify ambient light while the darker ground coloration renders the rest of the lizard invisible in a dimly lit environment. Further enhancing the illusory effect of the reflective scales, dark pigment surrounding each white ocellar scale varies in intensity, apparently depending on the stress level of the animal. We observed that pigmentation becomes darker when lizards are initially handled, but fades to a lower intensity after several min-

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Our observations of P. shrevei provide empirical evidence refuting Sanderson's (1939) claim of bioluminescence in this cies. Instead, the lizard's unique scales act like small parabolic mirrors, reflecting light at oblique angles. The intensity of this reflectivity is, in turn, influenced by the intensity of surrounding dermal pigmentation and by the angle at which a lizard is oriented relative to a light source. Thus, ocellar reflection produces an illusion that light is emitted by P. shrevei at varying in-

tensities, a phenomenon which obviously has confused a number of persons. The results of our investigation substantiate the predictions of Roth and Gans (1960) and provide scientific credence to the anecdotal accounts of numerous naturalists. The functional significance of the reflective ocellar scales, found only in adult males of P. shrevei remains unknown.

Perhaps more remarkable than the unique reflective scales, our observations revealed that P. shrevei differs from known tropical lizards in at least two aspects. First, adult P. shrevei are intolerant of heat, despite their tropical distribution. Second, the species incubates its eggs at very low temperatures relative to other squamate rep-

tiles. Thus, P. shrevei possesses the curious trait of being a cold-adapted tropical lizard. Boos (1979) first hinted at the species' unique physiology when he noted that specimens of P. shrevei are so sensitive to heat that they rarely survive transport out of their restricted range. Our observations show that P. shrevei typically occupies a microclimatic range of 20-23 °C in its cave entrance microhabitat. Handled specimens went into stress after 2-3 min at temperatures greater than 24 °C, but revived once returned to cooler, moister conditions. However, an adult male died in captivity after its cage temperature reached a maximum of 28 °C despite provisions of moist refugia. This would indicate that 24-28 °C is lethal to P. shrevei. By comparison, other tropical members of the family Teiidae show a minimum body temperature of 27 °C, a mean of 40.5 °C, and a lethal maximum of 45-46 °C (see review by Brattstrom 1965). Clearly, P. shrevei represents an exception to the physiological characteristics that define other teiid lizards. Perhaps P. shrevei behaviorally avoids lethal ambient temperatures by retreating into caves and deep crevices for significant periods each day.

Read (1986) and Sanderson (1939) both reported finding egg masses of P. shrevei in either vegetation or rock crevices. Eggs are often adhered in pairs, indicating a clutch size of two, and the number of eggs at each nest site may range from a single pair (Read 1986) to 80 eggs (Quesnel, unpublished

data). We found two oviposition sites in rock crevices at the cave entrance atop Mt. Aripo. One nest site measured 17 x 51 mm at the opening and was 90 mm deep, while the other was 19 x 30 mm at the opening and 115 mm deep. Both nest sites contained a communal egg mass inside and the remains of several already-hatched eggs near the entrance. Temperatures inside each nest were measured and were found to maintain a constant temperature of 20.5 °C throughout the day. Such a low incubation temperature is unique among known lizards, and resembles conditions experienced by eggs of temperate zone salamanders (Gutzke unpublished data).

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IN MEMORIAM-William H. N. Gutzke, Ph.D. - coauthor, mentor, and friend.

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Shedding Light on the Luminous Lizard (Proctoporus shrevei) of Trinidad: A Brief Natural History

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ABSTRACT. A herpetological debate lasting nearly 70 years regarding the so-called luminous lizard, Proctoporus shrevei, of Trinidad is addressed. Published natural history accounts from the 1930s suggested that males of the species possess the capability of producing light. Despite the potential significance of such a trait in a terrestrial vertebrate, no direct studies of P. shrevei were conducted and findings from indirect studies were equivocal. To resolve the debate, a field investigation was conducted in May 2001 and 2002 with adult P. shrevei in Trinidad. Evidence supported the hypothesis that the lizards' scales are highly reflective and, when combined with fluctuations in dermal pigmentation, this produces an optical illusion consistent with early natural history observations. No evidence for bioluminescence was found. However, despite being a tropical organism, P. shrevei displays intolerance to heat and life history adaptations to relatively cold, cave-entrance microhabitats.

KEYWORDS. Teiidae, Trinidad, bioluminescence, thermal ecology, ectothermy.

In March 1937, naturalist Ivan Sanderson collected specimens of the teiid lizard Proctoporus shrevei from cave entrances near the summit of Mt. Aripo in Trinidad, West In-

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with a series of white lateral spots, each surrounded by a ring of black pigment (Parker 1935; Murphy 1997). These markings became the source of controversy when Sanderson described them as being luminous. As Sanderson (1939) recounts, '...in a crevice beneath a ledge I saw a dim light which promptly went out. I flashed the torch in and there was a small lizard. Putting a net over one end of the cleft, I tickled [the lizard], but instead of running out, it turned its head away from me and both sides lit up for a few seconds like the portholes on a ship. Eventually I got [the lizard] out with forceps, and as I held it up, it again lit up brilliantly." Specimens were subsequently shipped to the British Museum in London where they were examined post mortem by H. W. Parker. Parker

FIG. 1. The luminous lizard, Proctoporus shrevei, from the summit of Mt. Aripo, Trinidad. Photograph by: Mike Knight.

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Courtesy: Gary Mangiacopra
The Tuscarora Mountain
HUNDERBIRDS HAVE SOAKED
through Pennsylvania folklore
for more than a hundred years, and
there is some recent evidence for the
possibility that the legendary big birds
have not yet flown the coop.
Although rural rumor (e.g. "Hey.
my cousin knows a guy who had a
friend who saw one!") in north-
central Pennsylvania would place the
Thunderbird population equal to that
of the American Cow, few eyewitness
T-Birds
by Carl Larsen
Strictly speaking. birds like
these could not exist in north-
central Pennsylvania or else
where on this planet in this
day and age. But the witnesses
do not doubt what they saw,
and their answer to the skeptics
is a smile and just two words:
"They're here!"
Cardinals
those of us who del in possibilities
but remain skepticas. (See Jung, sec
Fort, see the St
going en ma fro rst to third in
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dimensions increasith me, then
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From inRVIC w
three separate cac
witnesses in
can parrow
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reports have surfaced since the 1969 1970 flap of sightings in the mountainous region around Jersey Shore. Pennsylvania But on August 5, 1981 a pair of giant birds nearly collided with an automobile on Tuscarora Mountain, 25 miles from Harrisburg the state capital.
The occupants of the car. Leverne and Darlene Alford, contacted me the following day through a mutual friend. I interviewed them, and they supplied the accompanying sketches and, later, a letter confirming some of the details of their sighting
The Alfords seemed to be sane, middle-class, responsible people, both in their carly thirties. Leverne works as a counselor at a youth development center, and Darlene is a housewife and former counselor at the same ageticy
Their close encounter-they came within two yards of a collision-with a pair of unidentifiable and oversized flying creatures left them sin derstandably curious. Few buds of flight leave one with the impression that they were "awesome" or "overwhelming.
PR
For some basic background and/or speculation on Thunderbirds, see Pursuil, Vol. 5, No. 2: Vol. 8, No. 2, Pursuit 106
NECK
and Vol. 9, No. 2 As noted therein, the late Robert H. 1 yman gathered dozens of published sightings dating back as far as 1845. His pair of books. Forbidden Land and Amazing in deed, cover a multitude of Pennsylvania anomalies and are still available from The Potter Enterprise, Couders port. Pa Other references are published in the Corlist Sourcebook en titled Strange Life.
Legends of the Pacific Northwest Amerindians tell of Thunderbirds

plucking whales from the sea and
depositing scarred carcasses in the
Treetops. Sliding across the ages from
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pressions or evey or feet on the two
Dears.
The sincerity of the two repotters
was as convincing as all other aspects
of the unusual sighting They bad,
and have, nothing to prove or gain
from it. Discussions with other bird-
sighters, although based on encoun-
ters that had taken place in the 1969-
10 Gap, only confirmed or added def-
inition to the Alfords' story.
BEAK
And why so many of the scientifically
sanctified manage to locate tidier
corners of the dusty universe in which
to piy their trade.
Another survivor of the decade-old
flap is Anna Mincer, who earned the
monicker "Bird Lady" by publicly
admitting that she saw what she saw.
In a telephone interview, she recalled
her first Thunderbird sighting
She and her late husband were in
their heck yard, which reaches down
to the bank of the Susquehanna River.
It was a morning in 1969, and she
clearly remembers the shadow the!
passed overhead and caused her to
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TAIL
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"Hell, that ain't no airplane, he repued. Whatever it was in the sky, it was the size of an airplane but as soundless as a cloud.
"It was mammoth. Very dark col. ored, nearly black. And it flew low enough for us to see that the claws were as big as my husband's hand-and he was a big man." Anna paused.
"It seemed to soar along on the air currents. Then it would circle, and move back toward the mountains."
They saw what looked like the same bird later that day, and on several occasions the following year.
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thing they could not identify.
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Courtesy: Gary Mangiacopra
The Tuscarora Mountain
HUNDERBIRDS HAVE SOAKED
through Pennsylvania folklore
for more than a hundred years, and
there is some recent evidence for the
possibility that the legendary big birds
have not yet flown the coop.
Although rural rumor (e.g. "Hey.
my cousin knows a guy who had a
friend who saw one!") in north-
central Pennsylvania would place the
Thunderbird population equal to that
of the American Cow, few eyewitness
T-Birds
by Carl Larsen
Strictly speaking. birds like
these could not exist in north-
central Pennsylvania or else-
where on this planet in this
day and age. But the witnesses
do not doubt what they saw,
and their answer to the skeptics
is a smile and just two words:
"They're here!"
Cardinals
those of us who del in possibilities
but remain skepticas. (See Jung, sec
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reports have surfaced since the 1969
1970 flap of sightings in the moun-
tainous region around Jersey Shore.
Pennsylvania But on August 5, 1981
a pair of giant birds nearly collided
with an automobile on Tuscarora
Mountain, 25 miles from Harrisburg

the state capital.
The occupants of the car. Leverne and Darlene Alford, contacted me the following day through a mutual friend. I interviewed them, and they supplied the accompanying sketches and, later, a letter confirming some of the details of their sighting
The Alfords seemed to be sane, middle-class, responsible people, both in their carly thirties. Leverne works as a counselor at a youth development center, and Darlene is a housewife and former counselor at the same ageticy
Their close encounter-they came within two yards of a collision-with a pair of unidentifiable and over-sized flying creatures left them sin derstandably curious. Few buds of flight leave one with the impression that they were "awesome" or "over-whelming.
PR
For some basic background and/or speculation on Thunderbirds, see Pursuil, Vol. 5, No. 2: Vol. 8, No. 2,
Pursuit 106
NECK
and Vol. 9, No. 2 As noted therein, the late Robert H. 1 yman gathered dozens of published sightings dating back as far as 1845. His pair of books. Forbidden Land and Amazing f deed, cover a multitude of Pennsyl-vania anomalies and are still available from The Potter Enterprise, Couders port. Pa Other references are pub-lished in the Corlist Sourcebook en titled Strange Life.
Legends of the Pacific Northwest Amerindians tell of Thunderbirds plucking whales from the sea and depositing carred carcasses in the Treetops. Sliding across the ages from totem to Tuscarora is easy enough for
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the I-bird wiespeareewhere be-tween 15 and 25 that exceeds the Andean Condor beast half, and the lack of discrive coleration rule out
this largest sisting ing predator.
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pressions or evey or feet on the two
Dears.
The sincerity of the two repotters
was as convincing as all other aspects
of the unusual sighting They bad,
and have, nothing to prove or gain
from it. Discussions with other bird-

sighters, although based on encounters that had taken place in the 1969-10 Gap, only confirmed or added definition to the Alfords' story.

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And why so many of the scientifically sanctified manage to locate tidier corners of the dusty universe in which to piy their trade.

Another survivor of the decade-old flap is Anna Mincer, who earned the monicker "Bird Lady" by publicly admitting that she saw what she saw. In a telephone interview, she recalled her first Thunderbird sighting

She and her late husband were in their heck yard, which reaches down to the bank of the Susquehanna River. It was a morning in 1969, and she clearly remembers the shadow the! passed overhead and caused her to snakes.

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Does nomenclatural availability of nomina of new species or subspecies require the deposition of vouchers in collections?

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Abstract

Several species of birds and primates recently described opened a debate in the zoological community on the possibility of naming new species or subspecies without material onomatophores ("name-bearing types") deposited in collections.

The current writing of the Code is ambiguous in this respect. We support here the view that such practice is not doing a
service to the discipline of taxonomy as illustrations, DNA sequences or "definitions" cannot replace voucher specimens
The latter are and will be badly needed for the proper knowledge of the vanishing biodiversity of our planet. We review
arguments pro and con the need to have a Rule in the Code requiring the deposition of onomatophores in collections for
the proper and valid creation of new nomina in zoological nomenclature. In conclusion, we propose a more drastic Rule
in this respect but also the possibility, in some exceptional cases, to apply to the International Commission on Zoological
Nomenclature to make nomina available even in the absence of material onomatophores.
Key words: Biodiversity crisis - Nomenclatural availability Vouchers
Onomatophores - Collections -Illustra-
tions - DNA sequences
- Definitions
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Commission
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Introduction

This paper discusses an important question of zoological nomenclature at the verge of the "century of extinc-
tions" (Dubois 2003): that of the nomenclatural availability and consequently validity of zoological scientific
names or nomina (Dubois 2000) published without onomatophores ("type-specimens"; see Dubois 2000,
2005) deposited in a collection. This problem has been raised recently for several species of vertebrates con-
sidered "rare and endangered". It is only one avatar of a new tendency in taxonomy, consisting in the descrip-
tion and naming of new taxa without voucher specimens, e.g., based only on molecular evidence, even when
no threat on the taxon is currently identified, or of taxa "defined" through "phylogenetic definitions" but with-
out vouchers or even diagnostic characters. Such problems may become more and more common if the strict
and clear Rules of the International Code of Zoological Nomenclature (Anonymous, 1999, "the Code" hereaf-
As it develops, the biodiversity crisis
ter) regarding nomen availability are not understood and adopted by all zoologists and scientific editors.
mainly caused by anthropogenic factors = will more and more
face zoologists with the ethical dilemma of sacrificing specimens potentially important for the survivorship of
their species in order to satisfy the minimum criteria established by the Code to make a new nomen available.
will go on and as new taxa
This situation already exists but will tend to become more frequent in the forthcoming years, as extinctions
- especially of vertebrates - will be discovered in isolated refuges, with small

relict populations and therefore highly threatened with extinction. Whereas some taxonomists aim to rely on
scientific objectivity and precision through the deposition of fixed reference specimens (onomatophores) in
public collections, some are also tempted to skip this procedure to give new discovered species with tiny pop-
ulations a better chance of surviving. However, the Code does not provide special conditions for describing
"endangered" species, and its Rules for the nomenclatural availability of nomina must be followed if the latter
are to be used validly to designate zoological taxa.

This problem concerning onomatophores is but one special example of a more general trend in recent sci-
entific literature dealing with systematics, phylogeny and evolutionary biology, where the important role of
vouchers is underestimated, if not ignored or denied (Funk et al. 2005). This is illustrated by the fact that some
major databases such as Genbank do not require the indication of voucher specimens associated with the
information they store (molecular sequences in the case of Genbank). The case of the classical cytological
studies in botany reminded by Funk et al. (2005: 127) is exemplary of what could be the fate of some of the
data in Genbank and other databases: "the absence of vouchers for literally thousands of early chromosome
a majority of all counts made prior to 1965- has rendered those data essentually worthless: the
identity of the plants cannot be verified. The enormous effort made by those early cytologists comes to little or
nothing at all."
counts

No rules oblige taxonomists to deposit vouchers when they describe a new species, simply because there
is no "code of taxonomy" for reasons detailed by Dubois (2005). However, as soon as not only describing,
but also naming is involved - a distinct process, which belongs in nomenclature, not in taxonomy proper-,
vouchers are necessary. Although the nomenclatural role of these special vouchers is particular (to provide an
objective standard for the allocation of nomina to taxa; see below), these specimens have also "incidentally"
an important taxonomic function, that of providing material references for the characters described by taxono-
mists. Because of this secondary, taxonomic, function of onomatophores, the Code so to speak fills a defi-
ciency caused by the absence of a code of taxonomy. Onomatophores are indeed very important vouchers for
the whole of evolutionary biology, and museums and other collections caring for their preservation in good
conditions play a major role in our understanding of biodiversity.

In the recent years, several zoological species were described as new without deposition of reference
specimens in collections, because these species were considered by their discoverers too endangered to allow

collection of even a single specimen without increasing their risk of extinction. Examples include the bird
Laniarius liberatus (Smith et al. 1991) and several primates: the mangabey Lophocebus kipunji (Jones et al.

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2005), later made the type of a new genus (Davenport et al. 2006); the lemur Avahi cleesei (Thalmann & Geissmann 2005); and the capuchin Cebus queirozi (Mendes Pontes et al. 2006). These cases have been in the center of a contentious debate on the need for keeping dead specimen holotypes for establishing the nomina of new animal species. Whereas some authors (Timm et al. 2005, Landry 2005, Oliveira & Langguth 2006) stated that the nomina of these taxa, if published after 1999, are nomenclaturally unavailable, others (Wakeham-Dawson et al. 2002, Polaszek et al. 2005) defended the opposite idea. Similar situations, although in these cases not caused by threats on the species but on "rarity" of species and difficulties in collecting them, were recently encountered in several cases of descriptions of new species based on DNA sequences only, without onomatophores, for example in whales (Dalebout et al. 2004, and references therein), and these cases were also taken as flag examples for a plea for "modern" nomenclature that could supposedly be "freed" from the constraint of depositing dead specimens in collections (Dalebout & Baker 2002): "Due to the declining abundance of many species, access to complete anatomical specimens is becoming a vanishing luxury. (...) For many animal taxa, the lethal collection of such voucher specimens would now also be considered unethical." (Dalebout et al. 2004: 459).

Interestingly, this new trend meets another recent one in biological nomenclature, illustrated by the promoters of nomenclatural systems alternative to the current codes, where allocation of nomina to taxa is not based on onomatophores but on so-called “phylogenetic definitions". As discussed in detail elsewhere (Dubois 2005, 2006b), a basic problem (among others) of such nomenclatural systems is that they miss the material connexion between language and specimens realized by onomatophores.

Our aim in this paper is to explore again this question in the light of the current Code and of other considerations.

Nomenclatural availability of nomina

Dubois (2005) distinguished three steps in the nomenclatural process required to establish the valid nomen of a taxon in zoology under the Rules of the Code: availability of nomen (through publication and respect of precise criteria), allocation of nomen to taxon (through onomatophore) and validity of nomen (through priority).

These three "floors of the nomenclatural house" must be explored successively. Regarding the first floor,
availability, Dubois (2000) recognized two categories of nomina: hoplonyms are nomina published through
respect of all Code's criteria of nomen availability, whereas anoplonyms are nomina published but not respect-
ing all these criteria, and therefore nomenclaturally unavailable (i.e., "non-existent" in zoological nomencla-
ture). Criteria of availability are mostly described in Chapter 4 (Articles 10 to 20) of the Code, but also in Chapter 1 (Articles 1 to 3) of the latter. The term nomen nudum (gymnonym in Dubois 2000) designates only a
subcategory of the category of anoplonym, as the "Glossary" of the Code (p. 111) defines it as a nomen "that,
if published before 1931, fails to conform to Article 12; or, if published after 1930, fails to conform to Article
13". To be an anoplonym, a nomen just has to fail to conform to any of the Articles 1-3 and 10-20, so this
covers a much wider array of cases than the category of nomen nudum.
It is important to realize that the Rules for nomen availability have changed through time, and these Rules
nowadays are much more stringent than in the past. Today, practising taxonomists are following these Rules,
not those of the past. Importantly, Article 16 is new, and it introduces important changes compared to the pre-
vious edition of the Code (Anonymous 1985). Let us review the Rules of the Code regarding nomen availabil-
ity.
Chapter 1 ("Zoological nomenclature") provides general Rules for admissibility of nomina covered by the
Code: nomina failing to conform these Rules are therefore anoplonyms. Article 1.1 states that zoological
nomenclature only covers nomina applied to taxa of extant or extinct animals, which excludes oganisms
referred to other kingdoms. Article 1.3 expressly excludes from zoological nomenclature several categories of

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nomina, in particular proposed "for hypothetical concepts" (Art. 1.3.1) or "after 1930, for the work of extant
animals" (Art. 1.3.6). The "Glossary" of the Code (p. 101) defines "hypothetical concept" as follows: "A tax-
onomic concept that when published contained no animal then known to exist in nature, past or present, but
only in the mind of the author whether a prediction or not". This sentence is strangely written, as a concept
cannot "contain" an animal, but "refer to" or "designate" it. The French version of the "Glossaire" (p. 235)
proposes a more accurate definition of "concept hypothétique", as it mentions that such a concept "n'est pas
nomina and nomenclatural acts published before 1758.

basé sur un animal (...)" ("is not based on an animal"). Article 3 excludes from zoological nomenclature all
Chapter 4 ("Criteria of availability") lists all criteria which must be met for a nomen to be available in zoological nomenclature. For the purpose of the present discussion, we will briefly survey most of these conditions and only outline a few of them. Articles 10 and 11 present general conditions of availability, in particular regarding the need of publication and the formation of nomina. Article 12 presents special requirements
that only apply to nomina published before 1931: any such nomen "must be accompanied by a description or
a definition of the taxon that it denotes, or by an indication" (Art. 12.1), and Art. 12.2 defines precisely the
meaning of the term "indication". Article 13 concerns nomina published after 1930, and requires that they "be
accompanied by a description or definition that states in words characters that are purported to differentiate
the taxon", or refers to such a published statement, or be proposed as a nomen novum (neonym in Dubois
2000) for an already available nomen. Article 14 excludes from zoological nomenclature nomina published
anonymously before 1950, and Article 15 excludes nomina published conditionally, or for taxa given the ranks "variety" or "form", after 1960. Articles 17 to 20 provide special Rules concerning availability of nomina in a few particular situations (e.g., nomina applied to taxa of hybrid origin, tautonymous nomina or subsequent spellings of nomina).

All the preceding articles existed, in similar or slightly different forms, in the past editions of the Code until the so-called third one (Anonymous 1985), and none of them mentioned the need, for availability of
nomina, of the existence of an onomatophore (holotype, syntypes, lectotype or neotype). However, an important change was brought to the Code in Article 16 of the fourth edition (Anonymous 1999), which added several requirements for availability of nomina published after 1999. These new requirements include the need of
an explicit statement of the intention to establish a new nominal taxon, the need to mention the type genus of
a new familial nomen, and, above all, the need of fixation of the onomatophore for any new specific or subspecific nomen. As this part of Article 16 will be in the center of the discussion below, it is better to provide a
large quote of it, including some of its Recommendations:

"16.2. Family-group names: type genus to be cited. (...) a new family-group name published after 1999 must be accompanied by citation of the name of the type genus (...).

16.4 Species-group names: fixation of name-bearing types to be explicit. Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original
publication

16.4.1 by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 where the holotype or syntypes are extant specimens, by a statement of intent that they will be (or
are) deposited in a collection and a statement indicating the name and location of that collection (see Recom-
mendation 16C).
Recommendation 16C. Preservation and deposition of type specimens. Recognizing that name-bear-
ing types are international standards of reference (see Article 72. 10) authors should deposit type specimens in
an institution that maintains a research collection, with proper facilities for preserving them and making them
accessible for study (i.e. one which meets the criteria in Recommendation 72F).
Recommendation 16D. Publication of information distinguishing type specimens. When providing
information to distinguish the type specimen(s) from other specimens (Article 16.4.1) authors should include

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data recommended).
information such as specimen numbers and descriptions of labels (see Recommendations 73C and 73D for
Recommendation 16E. Preference for holotype over syntypes. Whenever possible, authors should
select a holotype rather than syntypes.
Recommendation 16F. Illustrations of type specimens. Whenever possible a holotype or syntypes
is established."
should be illustrated, showing characteristic features of the taxon, in the work in which the new nominal taxon
Also relevant for this discussion are the following Articles:
"72.2. Fixation of name-bearing types from type series of nominal species-group taxa established
before 2000. A nominal species-group taxon established before 2000 may have its name-bearing type fixed
from the type series (...) originally (...), or subsequently (...). (If no name-bearing type is believed to be extant
a neotype may be fixed; see Article 75 for conditions).
72.3. Name-bearing types must be fixed originally for nominal species-group taxa established after
1999. A proposal of a new species-group taxon after 1999 (unless denoted by a new replacement name
(nomen novum) (...), must include the fixation of a holotype (...) or syntypes (...). In the case of syntypes,
only those specimens expressly indicated by the author to be those upon which the new taxon was based are
fixed as syntypes.
(...)
72.5. Eligibility as name-bearing types. Only the following are eligible to be a name-bearing type, or
part of a name-bearing type, or a nominal species-group taxon:
72.5.1. an animal, or any part of an animal, (...);
72.5.6. In the case if a nominal species-group taxon based on an illustration or description, or on a biblio-
graphic reference to an illustration or description, the name-bearing type is the specimen or the specimens
illustrated or described (and not the illustration or description itself).
(...)

72.10. Value of name-bearing types. Holotypes, syntypes, lectotypes and neotypes are the bearers of the
scientific names of all nominal species-group taxa (and indirectly of all animal taxa). They are the interna-
tional standards of reference that provide objectivity in zoological nomenclature and must be cared for as such
(...). They are to be held in trust for science by the persons responsible for their sage keeping.
Recommendation 72D. Labelling of name-bearing types. Holotypes, syntypes, lectotypes and neotypes should be labelled in a way that will unmistakably denote their status.
Recommendation 72E. Publication of information on labels. An author who designates a holotype, lectotype, neotype or syntypes should publish all information that appears on the labels accompanying the
specimens so as to facilitate the future recognition of the specimens.
Recommendation 72F. Institutional responsibility. Every institution in which name-bearing types are deposited should
72F.1 ensure that all are clearly marked so that they will be unmistakably recognized as name-bearing types;
72F 2 take all necessary steps for their safe preservation,
72F.3 make them accessible for study;
72F4 publish lists of name-bearing types in its possession or custody, and
72F.5 so far as possible, communicate information concerning name-bearing types when requested.
(...)
73.1. Holotypes. A holotype is the single specimen upon which a new nominal species-group taxon is based in the original publication (...).
73.1.1. If an author when establishing a new nominal species-group taxon states in the original publica-
tion that one specimen, and only one, is the holotype, or 'the type', or uses some equivalent expression, that
DEPOSITION OF VOUCHERS

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specimen is the holotype fixed by original designation. (...)
73.1.4. Designation of an illustration of a single specimen as a holotype is to be treated as designation of
idate the designation. (...)
the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself inval-
Recommendation 73C. Data on the holotype. An author who establishes a new nominal species-group taxon should publish at least the following data concerning the holotype, if they are relevant and known to the
author: (...)
73C.6 the collection in which it is situated and any collection number or register number assigned to it, (...)"
Changes in the Code regarding the nomenclatural function of onomatophores
Before discussing the problem addressed by the papers mentioned above, it is useful to clarify the nomencla-
tural function of onomatophores ("name-bearing types"). One often reads that these specimens "provide
objectivity in zoological nomenclature" (e.g., Art. 72.10 of the Code quoted above). This is true, but needs
more precise qualification. The function of these specimens is not, as some have construed it (e.g., de Queiroz

& Gauthier 1990, 1994; Pennisi 2001; Joyce et al. 2004; Sluys et al. 2004), to provide characters that would allow to define the taxon to which the nomen is applied: this would rely on a typological conception of taxonomy which is outdated and that few recent taxonomists would support (Dubois 2005). The definition of taxa is not a matter of nomenclature but a matter of taxonomy, and the Code does not deal with taxonomy but with nomenclature. The Code does not provide rules or guidelines for defining taxa, but Rules for naming taxa once they have been defined. To avoid such basic confusion, extirpation of the term "type" of its derivatives from the vocabulary of nomenclature would be useful (Dubois 2005) and this is why we here use the term onomatophore (Simpson 1940) for "name-bearing type" in the Code.

The main role of onomatophores under the Code is to provide an objective connexion between the world of specimens (and, through them, of natural populations of organisms) and the world of language (Dubois & Ohler 1997a-b). It allows allocation of a nomen to a taxon or several taxa. A given nomen applies potentially - in fact, it only applies to a single taxon or a few taxa, because to any taxon that includes its onomatophore- of the existence of several nominal-series and of the Rule of Coordination (for details see Dubois 2006b and and that is all. This function of onomatophore (bearing the nomen) pertains in the second submitted-a) floor of the nomenclatural house (nomen allocation) and has nothing to do with availability of nomen. Until 1999, no Rule existed requiring the designation of an onomatophore for availability of a nomen, and Rules allowed subsequent fixation of onomatophores for nominal-taxa first created without onomatophores (at least in the species and genus nominal-series). The 1999 edition of the Code introduced a new function for onomatophores, in requiring their designation for a nomen to become available. This is an important change, highly welcomed by taxonomists (see below), but which does not imply that onomatophores, as such, are used to provide the characters of the taxa denoted by the nomina. "As such" means that, beside their nomenclatural function of onomatophores, the same specimens, which are part of what the Code calls the series of "type specimens", but which is better designated as the hypodigm (Simpson 1940, Dubois 2006a), also have a taxonomic function, which is to provide characters that will be used to build up a taxonomy (nowadays often through the formulation of a phylogenetic hypothesis).

In the 1985 Code, explicit designation of an onomatophore was compulsory for nomen availability only for nomina of the genus-series, as Article 13.b required that such a nomen created after 1930 "be accompanied by the fixation of a type species". The 1999 Code is much more consistent in this respect, as its Article 16.2

requires that new family-series nomina created after 1999 "be accompanied by citation of the name of the type
genus", and its Article 16.4 provides a similar Rule for species-series nomina (see below). Such Rules are

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as
md most welcome, because they clearly point to the Principle of Onomatophores as the basic prin-
for allocation of nomina to taxa in the Code. This is a major difference with other nomenclatural systems
those supported by proponents of various systems of "phylogenetic nomenclature", and this is the main reason why both kinds of nomenclatural systems are incompatible and cannot be "reconciled" or "mixed"
suggested by some (e.g., Kuntner & Agnarsson 2006). This is also the major reason for superiority of the
Code over these alternative systems, as it maintains a permanent link between specimens and nomina and is
therefore not an internal system within language, and as it allows nomenclature to remain theory-free regard-
(Dubois 2005 and submitted-a).
ing taxonomy, and therefore liable to adapt to new taxonomic paradigms that might develop in the future
For the availability of nomina, the last edition of the Code now requires "fixation" of onomatophores. "Fixation" means that, to be available, a new nomen must have been created associated with the fixation or
designation of a holotype or syntypes. By itself, this statement simply requires this designation, but not clearly that the onomatophore be preserved after designation and description, as will be discussed below.
Why was this important change brought to the Code? No explanation was provided in this respect in the
"Introduction" of this edition (Ride 1999), although this text spent space tackling other minor questions or
points that were not yet in order at the time of its publication (such as the eventuality of "replacing 'publica-
tion' as a primary determinant of availability", a very questionable idea indeed). We can see two immediate
reasons for supporting this major change: (1) requiring the designation of onomatophores avoids the introduc-
tion into nomenclature of nomina based on "hypothetical concepts", as defined above; (2) it avoids the cre-
ation of "phantom nomina", as defined by Vences et al. (1999). These points will be further clarified and discussed below, but it should be clear already that, if these two reasons are indeed behind the change in this
article of the Code, simple consistency would require that onomatophores be not only designated but also pre-
served, as otherwise none of these two problems would be solved.
As a matter if fact, there is an apparent contradiction between Articles 16.4.1 and 16.4.2 of the new Code.
Article 16.4.1 requires the explicit fixation of an onomatophore for any new species-series nomen to be avail-

able. A common sense interpretation of this Rule is that this fixation of the onomatophore must always be fol-
lowed by its deposition in a public collection, all the more that Article 72.10 states that such specimens are
"international standards of reference" that "are to be held in trust for science". This would mean that nomina
created on the basis of an illustration, without real specimen, would be anoplonyms if published after 1999.
However, this interpretation is not straightforward. Article 16.4.2 starts with the words "where the holotype or
syntypes are extant specimens" - which means that they may not be extant specimens, and therefore may not
be deposited in a collection. Polaszek et al. (2005: 2165) recognized that the current wording of Article 16 of
the Code is ambiguous and should be made clearer, since they wrote: "The well-intentioned reactions of Lan-
dry and Timm et al. show that the current Code is open to different interpretations on the subject of type spec-
imens". What can be these "different interpretations"?
According e.g. to the Oxford Dictionary (Thompson 1995: 476) "extant" means "still existing", and the
"Glossary" of the Code (p. 104) also defines it as "still in existence". The first part of Art. 16.4.2 thus suggests
that the holotype or syntypes may not be still in existence without impeding nomenclatural availability. There
seems to be three possible reasons why it could not be the case: (R1) the specimen was examined by the
describer, then killed, fixed and deposited in a collection, but later destroyed, lost or misplaced, so that it had
disappeared at the time of publishing the description; (R2) it was examined alive by the describer, but then
escaped or was set free before publication of the description; (R3) it was described only from indirect evi-
dence (drawing, photograph, description, traces, etc.), but it has never been in the hands of the describer. The
first case (R1) must be extremely rare in the case of nomina created after 1999, as it is unlikely that a speci-
men was killed, deposited in a collection, and destroyed or lost just after, before publication of the description,
in a period of a few years. In contrast, both the second and third possibilities may apply to nomina created
after 1999 and covered by Article 16.4.2 if the current Code.
DEPOSITION OF VOUCHERS

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Polaszek et al. (2005) and others interpreted this article as meaning that a species can be named without
depositing an onomatophore in a collection. This interpretation (11) is supported by Article 73.1.4, which
states that, even after 1999 (as no mention of a limiting date is made in this article), an illustration may be des-

ignated as onomatophore of a new taxon, and that "the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation". With this interpretation, the mention of the possibility to create a new nomen without "extant specimen" almost amounts to a return to the situation before 1999 and largely nullifies the progress introduced in the Code by Article 16.4.1. It still allows nomina to be created entirely within language, without objective reference to specimens, and is therefore a half-way measure which seems questionable. Under this interpretation, the post-1999 nomina mentioned above (Lophocebus kipunji, Avahi cleesei and Cebus queirozi) are hoplonyms (nomenclaturally available).

However, another interpretation (12) of this article is possible. Under this reading, the case (R3) above would be acceptable, but not the case (R2). In the latter situation, the species was described on the basis of a living, therefore then "extant" specimen, and Article 16.4.2 would therefore require its deposition in a collection, or statement of intent of such a deposition. Under such an interpretation, it is not acceptable to release this specimen free, as this would contravene the dispositions of this article. Therefore, description of a new species based on a living specimen would allow availability of nomen only if the specimen is, or will later be, deposited in a collection. Under this reading of the Code, the latter would give no license to release a holotype after capture, description, photograph and possibly taking off a sample of blood, feather or hair for DNA analysis. If this is accepted, the three nomina listed above (and others in the same situation) are anoplonyms (nomenclaturally unavailable).

As recognized by Polaszek et al. (2005), the current writing of Article 16 does not allow by itself to choose between these two interpretations. The choice by Wakeham-Dawson et al. (2002) and Polaszek et al. (2005) of interpretation (I1) seems to be based on two widely different elements. The first one is Article 73.1.4, which, as mentioned above, allows designation of a figured specimen as onomatophore without limiting date (i.e., even after 1999). If interpretation (12) was considered valid, then Articles 16 and 73 would be in contradiction. The second element is the fact that interpretation (11) is supported by current and past members of the International Commission on Zoological Nomenclature ("the Commission" hereafter), including its current (Andrew Polaszek) and preceding (Philip Tubbs) Secretaries, so it would seem to correspond to the "intention" of the authors of the current edition of the Code, who did not wish to make deposition of a holotype in a collection compulsory for nomen availability. However, when "juridical" texts like the Code are concerned, the intention of the draftsmen is of little importance, what counts is the final text. The current text being ambiguous, it should be clarified in the next edition of the Code by adding some precisions. It can be so in two different directions.

If the aim is to support interpretation (11) above, a single change is required: (C1) a second part should be
added at the end of Article 16.4.1, stating that "this or these specimen(s) may be extant or not".
If the aim is to support interpretation (12) above, three changes should be brought to the present Code.
(C2) Article 16.4.1 should be written as follows (or an equivalent writing): "by the explicit fixation of one or
several extant specimen(s) as holotype or syntypes..."; (C3) the first 8 words of Article 16.4.2 should be sup-
pressed and this article should start with "by a statement..."; (C4) Article 73.1.4 should start with the words
(or equivalent): "For nominal taxa created before 2000".
Until changes are brought to the current writing of the Code in either of these two directions, the ambigu-
ity described above will remain, but as the current officers of the Commission are not in favour of forbidding
description of a new species without an onomatophore, they are likely to "impose" their interpretation to the
international community of taxonomists. Under this interpretation, there is no contradiction between Articles
16 and 73, whereas under the interpretation (12) these two articles are not consistent, and one of them, at least,
should be changed.
Thus, under interpretation (11), favored by the Commission, the current Code allows to create a new

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appropriate? Let us explore this question in more detail.
nomen without an extant specimen, especially if an illustration of this specimen exists. Is such a Rule indeed
Illustrations as onomatophores
In botanical nomenclature (McNeill et al. 2006), the onomatophore of a specific or infraspecific nomen can be
either a specimen or an illustration (Art. 8.1). In the latter case, the botanical code makes it quite clear that the
onomatophore is the illustration, not the specimen shown by the latter, although it is recommended to go back
to material specimens for nomen allocation: "When a holotype, a lectotype, or a neotype is an illustration, the
specimen or specimens upon which that illustration is based should be used to help determine the application
of the name" (Art. 8.1). Such Rules have an important consequence: as the illustration itself is the onomato-
neotype for the taxon.
phore, the fact that the specimen on which the illustration was based is now lost does not allow to designate a
The situation is different in zoology. According to the Rules of the current Code, the status of illustrations
as basis for the creation of new zoological nomina depends on the date of publication. For nomina published
before 1931, one possible "indication" that can be used to make them available is defined as follows in Article

12.2.7: "the proposal of a new genus-group name or of a new species-group name in association with an illustration of the taxon being named, or with a bibliographic reference to such an illustration". Therefore, before 1931, a new nomen could be created even without a verbal description or definition of the taxon for which it was intended. This is no more possible after 1930, as after that year Article 13.1.1 requires that a nomen "be accompanied by a description or definition". However, in this article it is not stated that an author must have had a specimen in the hands to write a description or indication, and the latter may well have been prepared on the basis of an illustration. The new Article 16 does not suppress this possibility. It just requires an explicit fixation of an onomatophore, but not clearly that this specimen be "an extant specimen". This is further confirmed in Article 73.1.4 copied above.

There is a basic difference between the botanical and zoological codes as concerns the status of illustrations as onomatophores. In contrast with the botanical code, the zoological code makes it clear that the onomatophore is the specimen(s) figured, not the illustration itself. This has an important consequence regarding the situation, which is rather common when old illustrations are concerned, where the specimen(s) used as a basis for the illustration is/are now lost or destroyed. In such a case, the onomatophore is no longer extant, which opens the possibility to designate a neotype for the taxon if the conditions of Article 75.1 are met, i.e., when "an author considers that a name-bearing type is necessary to define the nominal taxon objectively".

This is a very useful particularity of the Code. In particular, it allows to settle at best the nomenclatural status of nomina created in old works on the basis of syntypes consisting in several specimens and/or illustrations, especially when these were of different origins and likely to belong in different taxa. One possible procedure in such cases, used e.g. by Kottelat & Lim (1993), Dubois & Ohler (1995) and Kottelat & Persat (2005), and illustrated and explained in detail in Dubois & Ohler (1997a-b), is to solve the ambiguity attached to the nomen by a nomenclatural action involving two distinct steps: first, to designate as lectotype one of the specimens figured, which can allow for example to restrict the type-locality of the taxon and to eliminate the other syntypes from the onomatophore; and then, taking advantage of the fact that this specimen is no more extant, to designate a neotype from the same locality.

So, despite its new Article 16.4.1, the current Code still apparently leaves open the possibility to create a new nomen on the basis of an onomatophore shown in an illustration but not available nowadays for study, i.e., a virtual or missing specimen. Clearly, some authors are in favour of this system, and others not. Let us

consider the pros and cons of this system.

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Arguments for and against basing nomina on virtual or missing specimens

Favourable arguments

(1) The conservation issue

The first argument in favour of accepting availability of nomina even in the absence of extant onomatophore deposited in collections is of course the "conservation" one. It does not seem adequate to collect and kill even a single specimen of a species that, at the very moment of its discovery, appears to be on the verge of extinction. This reason was given by the authors of the primate and bird nomina mentioned above to describe these species without material onomatophores.

This argument in fact contains two different aspects. The first one is that it is genuinely believed by these biologists that capturing and fixing even a single specimen of such species may indeed have a major impact on the survival of the latter. This will be further discussed below. The second one is in fact quite distinct: it is that killing a specimen of such an endangered species would certainly not be understood by conservationists and more largely by "the public". Such a behaviour would appear "irresponsible" to these people, and, above all, would contribute to give a bad image of taxonomists to outsiders of the discipline of taxonomy. As the latter is already poorly understood and appreciated among biological sciences, and, by way of consequence, severely underfunded and much too short in professional positions (Dubois 2003, Wheeler et al. 2004), any action that might contribute to undermine its image should be avoided by all means. Although they rarely state it clearly, this second motivation might be more important than the first one for taxonomists who decide to describe new species without fixed specimens.

(2) The difficuty or impossibility of collecting or conserving specimens

Some material reasons may make it very difficult or virtually impossible to collect or preserve specimens of a new species. This is in particular the case of some marine organisms, especially of very large size (such as some cephalopods or cetaceans) or living in deep habitats. Some of these organisms may be observed and photographed, e.g. from a deep-sea submersible, but not collected. Should taxonomy be deprived from dealing with such organisms because taxonomists cannot have them in the hands? In such cases, it could appear that naming such taxa on the basis of photographs alone is justified. This point will be discussed further below.

A related case would be that of organisms which for some reason, after collection, cannot be conserved in

such a way as to allow their subsequent study. However, this case seems to be mostly a theoretical possibility
as, although some organisms are more difficult than others to fix and conserve properly, it is usually possible
to find appropriate, even if unusual, modes of conservation for them.
(3) Descriptions based on ancient illustrations
This case might be the most convincing one for the formal description of species without having actual specimens in hands. Ancient iconographic documents are sometimes used by some taxonomists to provide
evidence that the specimens which were used to produce these illustrations belonged indeed in unknown, or at
least undescribed and unnamed, zoological species. This may even in some extreme cases be possible using
solely descriptions in words, without illustrations, when these descriptions are detailed enough, and appar-
ently accurate enough, to warrant such conclusions.
A good example of this situation is the formal description and naming by Bour (1978) of a new tortoise from the Mascarene, based on illustrations published in 1737 that were precise enough to allow ascertaining
the diagnostic characters of this species, which had become extinct around 1840 as a result of man's exploita-
tion (Bour 1984), and which was until then known only by imprecise descriptions of travellers. Interestingly,
this description prompted the discovery of subfossil remains of the same species, which allowed a more com-

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plete redescription (Bour 1979), and later to show that this species was in fact the one that had been originally
named Testudo indica Schneider, 1783 on the basis of a holotype, still extant, but which had been considered
for two centuries of unknown origin (Arnold 1979, Austin et al. 2002). Such exceptional discoveries will no
cies because no specimen is available.
doubt remain possible in the future, and it certainly would not be appropriate to forbid the naming of such
spe-
Unfavourable arguments
(1) Hypothetical concepts
The Code expressly excludes from its domain nomina proposed for animals not known with certainty to exist or to have existed in nature, "but only in the mind of the author whether a prediction or not". This defini-
tion may seem clear, but needs further information to become operational. The only way to be sure that an ani-
mal does not exist only in the mind of a person is to be able to examine a specimen. Such nomina can well be
"defined", even "phylogenetically", but they may not correspond to any organism in the real world. A striking
example is provided in a paper where many hypothetical groups of amphibians were defined (Lescure et al.

1986), based on phylogenetic hypotheses that were not supported by subsequent works (Nussbaum & Wilkinson 1989), so that these taxa fully correspond to the notion of "hypothetical concept" as defined in the Code.

As discussed below, a photograph by itself cannot be used as an objective proof of the existence of an animal, and a verbal description or a testimony, even if supported by several witnesses, cannot qualify as a scientific evidence, for several reasons spanning from observations that are inaccurate (although honest) due to various material reasons, to deliberate falsification or pure invention. Good examples of such problems are those posed by the various "mythical animals" that have been "seen", sometimes by many "witnesses", but for which material evidence is still missing, such as the abominable snowman and its avatars (yeti, migu, barmanu, sasquatch, etc.), the Loch Ness monster and various "sea snakes" and other marine monsters. Most of these stories are purely verbal, but some "material documents" indeed exist, such as "photos" of the Loch Ness monster or of the sasquatch, or recordings of the voice of the Caucasian barmanu, which all have in comment to be of "bad quality" (photos out of focus, recordings with noisy background, etc.).

In a few cases, Latin nomina were indeed proposed for such "animals", despite the absence of specimens, but on the basis of testimonies, descriptions, traces such as footprints, hair or "scalp", or even photographs.

An interesting case is that of the "iceman" formally described and named Homo pongoides on the basis of a specimen purported to have been examined through ice in an itinerant circus, but which later "disappeared", and for which several photographs and drawings were published (Heuvelmans 1969, Heuvelmans & Porchnev 1974). What can science do with such "descriptions" and nomina? How can the criterion of Article 1.3.1 for exclusion of "hypothetical concepts" be applied? Is the nomen Homo pongoides a hoplonym or an anoplonym, and, if it is a hoplonym, what is its status? Valid nomen, synonym, nomen dubium? If deposition of a specimen in a public collection was compulsory for availability of new nomina, such a question would not be raised, and formal description would have to await capture of a specimen or discovery of remains attributed to this "taxon".

(2) Phantom nomina

This concept was coined by Vences et al. (1999) for new nomina "accidentally" published without proper descriptions and identified vouchers in amateur publications or animal shop catalogues dealing with animal groups that attract many hobbyists (in their case brightly colored frogs of the genus Mantella Boulenger, 1882), on the basis of photographs of live specimens later sold to customers. These authors discussed the

major problems posed by the proper allocation of such nomina to taxa, then wrote "editors of hobbyist jour-
nals should not permit their authors usage of new scientific names to name undescribed or undetermined mor-

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phs unless the names are accompanied by a formal description and type specimens are deposited in a publicly
available scientific collection" (Vences et al. 1999: 56). For many taxonomists who work on such "attractive"
animal groups (e.g., insects, molluscs or vertebrates kept alive by aquariophilists and terrariophilists), the new
edition of the Code was received with relief, as the common sense interpretation of the new Rule of Article
16.4.1 is that it now imposes the deposition of onomatophores in public collections for new nomina to be
nomenclaturally available. But as this interpretation is not supported by Articles 16.4.2 and 72.5.6, nor by
officers of the Commission, taxonomists working on such groups should remain vigilant and expect new problems similar to those described by Vences et al. (1999).

(3) Photographs as scientific evidence

There is a widespread but unfounded belief that photographs are "better scientific evidence" than mere written descriptions or even drawings or paintings. There are several reasons why this belief is unfounded

First, photographs have always been liable to be falsified, and faked photographs have indeed been used in
many occasions, from political propaganda to commercial or juridical affairs, including science. A recent example in zootaxonomy concerns the new species of coelacanth from Indonesia described as Latimeria
menadoensis (Pouyaud et al. 1999), but for which shortly after a faked photograph was submitted for intended
publication in Nature (McCabe & Wright 2000). Nowadays, with digital photographs, faking has become even easier and virtually undetectable, and photographs should not be considered reliable proofs by them-
selves for anything. Faking is also possible with specimens, of course, but such falsifications, whether simple
hoaxes or intended to promote particular ideas or to support a personal's carrier, are usually discovered later
on by careful examination of the material, as was the case, e.g., for the "Piltdown man" (Weiner et al. 1953),
but such deceptions may be more difficult to demonstrate with digital photographs.

But faking is not the only reason why photographs are not the best way to know the characters of biologi-
cal species. Characters are not "facts" that would not depend on the subjectivity of observers. They are inter-
pretations of reality, usually based on a given "reading" by man of the phenotypes of organisms. They depend
on scientific judgements and decisions concerning homology, similarity and difference. In this respect, descriptions using words, or scientific drawings, are more informative, because they highlight some features

and ignore others, that are considered of no or little relevance for the characterisation of a taxon. In contrast,
the implacable objectivity of photographs, which capture in the same manner basic and "meaningless" charac-
ters of the specimens, or even sometimes artificial details such as shadows and lights - except, once again, if
photographs are modified to show special features, but then we come back to the problem above, does not
provide as much help to taxonomists.
Even with the best goodwill, study of photographs for taxonomic work implies the risk of misinterpreting some characters, of missing others, and sometimes of "inventing" still others. An enlightening example of the
latter situation is provided by the recent decription of the new taxon Torquerator bullocki (Holland et al. 2005). This organism belongs in a group of deep-sea hemichordates that were known from photographs but
had not been previously collected. On the basis of the interpretation of the photographs taken by submersibles,
where these worms appeared to have collar tentacles, these organisms had been considered a missing link (the
so-called "lophenteropneusts") between two main hemichordate body plans, the enteropneusts and the ptero-
branchs (Lemche et al. 1976), and this in turn had influenced ideas about the origin of vertebrates. Collection
and study of a specimen of this group showed that these interpretations were wrong. "The collar, although dis-
proportionately broad, lacks tentacles. In addition, we find no evidence of tentacles in the available deep-sea
photographs (published and unpublished) of broad-collared enteropneusts, including those formerly desig-
nated as lophenteropneusts. Thus, the lophenteropneust hypothesis was based on misinterpretation of deep-sea
photographs of low quality and should no longer be used to support the idea that the enteropneust body plan is
basal within the phylum Hemichordata." (Hammond et al. 2005: 374). In this case, it is therefore fortunate
that Lemche et al. (1976) were prudent enough not to publish a formal description and naming of these organ-

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isms on the basis of photographs alone, as the Latin nomina that could have been created for this purpose
would have turned out to be anoplonyms, being based in fact on "hypothetical concepts". In fact and more
exactly, they wrote that the nomen Lophenteropneust was "intended to cover a group above the family level
and thus no subject to the rules of nomenclature" (Lemche et al. 1976: 292), so that if in the future class-series
nomina are incorporated into the Code (Dubois 2006a) the status of this nomen will have to be settled.
There is no need to turn to deep-sea organisms to encounter problems with descriptions of new taxa based

only on photographs. Examples of such problems, discussed by Pauwels & Meirte (1996) and Pauwels &
Chérot (1997), include the description of the "Loch Ness monster" as Nessiteras rhombopteryx by Scott &
Rines (1975), that of Cryptophidion annamense by Wallach & Jones (1992) and that of Cadborosaurus willsi
by Bousfield & Leblond (1995). These cases, and several other ones, belong in the domain of "cryptozool-
ogy", a pseudo-science created by Bernard Heuvelmans on the basis of a misunderstanding, because he
thought that onomatophores were required by the Code for description of new zoological taxa (Pauwels &
Chérot 1997): in fact, they were not then, but the problems created by such descriptions led many zoologists
to hope that the fourth edition of the Code would require the designation of an onomatophore and its deposi-
tion in a collection for nomen availability. In the absence of such a Rule, it is formally impossible to exclude
from zoological nomenclature some extreme cases of "hypothetical concepts" described as new taxa. Thus,
the description by Quintart (1989), as Marsupilami franquini, of the marsupilami, an imaginary animal cre-
ated in cartoons by Franquin, was recorded in the Zoological Record, and there is no reason why the Rhino-
gradentia, imaginary organisms described with extravagant details by an imaginary professor (Stümpke 1962), should not be so!

(4) Alive specimens as onomatophores

In the recent years, some new species were described with live holotypes, maintained in captivity in zoos
or vivaria. Although zoological gardens can be considered as a special kind of "collections", keeping live
instead of dead animals, their status is quite distinct from collections of museums, for several reasons. First, as
long as it is alive, a specimen may escape and disappear forever. It may also die, and its death may not be
noticed immediately by the responsibles of its keeping: it may then be eaten, entirely or partly, by other cap-
tive animals, including "preys" provided for its feeding (crickets will rapidly eat a frog specimen after its death in a vivarium), it may desiccate or putrefy, etc. Even if found rapidly, in many cases, such a holotype
will often not be as well fixed as a specimen killed and fixed carefully for proper subsequent study. Thus, even
if the "intention" to fix and keep the specimen in a museum collection after its death is announced, for exam-
ple in giving it already a collection number even before its death (e.g., the holotype of Varanus melinus, see
Böhme & Ziegler 1997), this intention may not be fulfilled later on.

What can be the reasons for keeping a holotype alive instead of killing it before description of the new taxon? One of them may be to obtain its reproduction in captivity, which may be all the more desirable as the
species is rare and endangered. This can be a good reason only in some cases: specimens of both sexes must

be available (in taxa with separate sexes), and breeding must be feasible in captivity. These conditions are not always met, far from that. Other reasons may be to do ethological observations on this specimen in captivity, or simply to show the animal to the public (which is usually the case in zoos). No need to say, in many cases (e.g., in mammals and birds), behaviour in captivity is widely different from behaviour in the field, and the information that will be so obtained will be of little help to know the species better. The question should therefore be asked in all such cases: is the potential benefit that can be derived from keeping the specimen alive worthy of talking the risk to see this specimen escape, or be eaten or injuried by others, or desiccated or rotten, instead of having a well-fixed holotype in a nice position allowing good morphological studies? In many cases, the answer to this question will be "no". But then we come to another problem, the real "mawkishness" of many zoologists nowadays, which results in a number of them been simply reluctant to kill animals, for so-called reasons of "ethics". This problem is explored further below.

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The conservation issue

Let us come back here to the conservation issue, in a different perspective from that presented above. If a species is found so critically threatened by extinction that the collection of a single individual would be a risk, then it is quite possible, not to say very likely, that this species will not survive long in nature due to obvious reasons of population dynamics and genetics. In this situation, what is ethical? To allow the species become extinct without documenting the loss? On the contrary, isn't it then an ethical responsibility of zoologists to keep at least one specimen in a museum to document the existence of a species which became extinct during modern times, in most cases as a result of human action? From a scientific point of view, this course, documenting the biological information on diversity, is certainly preferable to that consisting in leaving this species become extinct without keeping a single material testimony of its existence for future generations of biologists. Then, if a species is threatened by extinction, it is an additional argument to keep a specimen in a museum, not to the contrary.

It is quite likely that "extreme conservationists", and even perhaps most "conservationists", will not agree with the statement above. They will probably say that, as long as a species has "a chance" to survive, it should be left this chance. Some of them would certainly even push this argument further, and suggest that, even

when only one specimen of an undescribed species remains alive, and has no possibility to leave an offspring,
it should be left alone, free and untouched whereas a responsible taxonomist would certainly think that this
specimen should be either immediately killed and fixed, or kept carefully in captivity for preservation at its
death. We are in fact here in front of genuinely different approaches to species extinctions on our planet. Many
conservationists think that conservation should be the first priority in all cases, even when the chances of
recovery of the species are very weak or null, and even when this attitude threatens the possible obtention of
basic biological information on this species. In contrast, many taxonomists will think that preserving at least
one specimen in order to preserve information for science, should be the priority in such situations. Both
points of view have supporting arguments, and there is not "one truth" in this respect. What will be decisive in
the end is the relative social influence of the supporters of each approach. In this respect, it is clear that nowa-
days conservationists have built up strong social lobbies to support their ideas, which is not the case of zootax-
who have shown until now very little aptitude for social communication and power (Dubois
onomists
2003) and who have not even proved able to create an international scientific society, not to mention a lobby
(Dubois 2006c). But this does not demonstrate in the least that the former are "right" and the second "wrong"
- only that the former are socially more efficient (which is widely different, and illustrated by many recent
decisions of "policy makers" in science, a matter which is far beyond the scope of the present paper). At any
rate, taxonomists should feel free to consider both options, and to do what they think is best, not what mem-
bers of another community think is best in order to please so-called "social demand", which is in fact merely
the demand of one social group, not of society as a whole.
As a matter of fact, the question may be asked whether the "message" that conservationists (at least those
who fight against the collection of specimens to document the diversity of life on this planet) want to pass to
"society" is the good one. This message is as follows: yes indeed, for centuries, and especially in the last
decades, human societies have made "choices" (sometimes without realizing that they were doing so) that had
major negative impacts on the ecological equilibria of the planet we live on, and in particular they have been
(and still will be) responsible for innumerable species extinctions; however, some of their members at least
have now become conscious of this problem, and have decided to do everything possible to stop this process.
These persons think that the major priority of the next decade should be to "stop the erosion of biodiversity".

Until this point, this message is likely to be agreed upon by most biodiversity-oriented biologists, including
conservationists and taxonomists. But consensus is absent when it comes to two further statements: (1) collec-
tion of specimens by taxonomists and for museums is a major factor of species extinctions; (2) we have the
power to "repair" the destructions that our civilization has done. Let us consider these two statements.
As oultined by Patterson (2002), not a single case is known where scientific collecting has imperiled or
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caused the extinction of any Neotropical mammal, and we do not know of a single case in any other zoologi-
cal group. In a few cases of species with commercial value, either as brightly colored, spectacular pets (espe-
cially in vertebrates), or as "rare" and very appreciated collection items (especially in insects and molluscs),
massive collection may have contributed to deplete or even wipe out some populations or species, but this has
nothing to do with taxonomic research and museum collections. Even when taxonomists collect what they
consider to be "large series" of specimens (quite useful for the appreciation of intra- and interpopulational
variation, and therefore for the characterisation of specific and subspecific taxa), such series are ridiculously
small compared with the captures made for human consumption, by pet trade or by insect or mollusc collec-
tors. It is hypocrit, misleading and ill-directed to confound both activities.
Taxonomists, who are an infime minority with a very little power, cannot be the scapegoat for all the mis-
takes and crimes made by our societies in the last century. It may be appealing to throw back all responsibili-
ties on this small and weak community, but it does not solve anything. Furthermore, even if this is not
appreciated by many, practising field taxonomists are in fact among the persons who have the best knowledge
of real biodiversity in the wild, and their daily experience is that extinctions are going on at a very rapid pace,
in many habitats but mostly in tropical areas, as a result of factors such as deforestation, destruction of humid
zones, pollutions of all kinds, climate changes, faunistic and genetic pollution (Dubois 2006c), etc. Most of
these destructions are of such a magnitude, and show no significant trend of change (despite repeated declara-
tions and statements), that it is completely misleading to pretend that these phenomena will stop in the next
decades, not to say that our civilization will "repair" the results of its mistakes.
Many of these debates, however, are carried out as if we were in an "ideal" world where it would be
enough to say something to see it happen. In the just recent years, many members of our societies (who were
still, several decades ago, treating those of us who were announcing massive extinctions, of birds of ill
omen

or simply of liers) have progressively become conscious that our civilization is indeed destroying a large pro-
portion of the species biodiversity of our planet. This is a nice step, but as long as it is not followed by major
changes in major options of our world, regarding industry, economics, profit and decision-making, this con-
sciousness-raising will have little material impact. Words won't replace action in this respect, and as long as
our societies do not make these major changes, extinctions will go on. Saying and writing the contrary is lying
to the public. And it is a lie to say that we will "repair" the damages we have done.
Promoting the idea that collecting one specimen for the taxonomic and nomenclatural purpose to have an
onomatophore, i.e., a testimony of the existence of a species for present and future researchers, is a major fac-
tor of species extinction, is an hypocrisy and a lie. It does not help "conservation biology" to reach any of its
but it may appear easier and less costly to pretend so than to struggle against industrial lobbies or
shareholders of companies responsible of the current disaster. Taxonomists should resist this pressure, and
organize themselves for this resistance.
aims-
Today, "conservation" appears to many as a more laudable aim than "knowledge". However, one of the
major aims of science, besides helping man to act efficiently in mastering the causes and effects, is "simply"
to "understand" the world we live in. One of the major aims of comparative (i.e., non-reductionist) biology is
to understand how evolution has proceeded, and to reply these "how" and "why" questions it is first necessary
to reply "what" questions (Mayr 1997). With less, or possibly much less, than 10% of the living species of
our planet yet collected, described and named, we cannot say that we are close to answering the "what" ques-
tions of biodiversity (Dubois submitted-a) - which means that we are still far from being able to answer the
"how" and "why" questions. Isn't it legitimate to think that answering these questions should remain a major
goal of science and culture?
The gigantic recent progresses in molecular study of organisms, especially through the use of nucleic acid
sequencing for molecular phylogeny, have tended to obscure the nature of biodiversity for many zoologists,
some of whom have no or almost no "culture" in morphology, anatomy, behaviour, etc. As interesting as
knowing the DNA sequences of an organism may be, these won't tell us everything about the organism. Until
the phenotype, behaviour, ecology, of a species have been studied, we know almost nothing about this species,
even if we have an hypothesis on its phylogenetic position and if we are able to "recognize" it by its DNA
DEPOSITION OF VOUCHERS

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Fortunately, in front of those who think that everything about organisms can be known from their
and photographs, the irreplaceable rôle of vouchers and specimen collections in systematics, and more
malogy (Patterson 2002).
generally in all works on biodiversity, has been outlined repeatedly by workers in botany (Funk et al.
2005),
herpetology (Stuebing 1998), ornithology (Goodman & Lanyon 1994, Remsen 1995, Winker 1996) and
mam-
The contribution of a specimen to our knowledge about biodiversity is roughly inversely proportional to
its rarity. Several steps can be distinguished in our knowledge of a species through specimens. The
first one is
passing from no specimen to one specimen. The second one is passing from one to several from the
same pop-
ulation, especially to a second one of the opposite sex. A third step can be recognized when small
series of
specimens, e.g., of 8-20 specimens of each sex from a population, are available, as these allow simple
statisti-
cal tests for comparisons of samples (Dubois 1984), and a fourth step is attained when samples from
several
populations referred to the same species have been collected. Among these steps, the one which is by
far the
main one, for our knowledge, is the first one. The number of characters that can be studied on a
specimen is
virtually endless (Dubois & Ohler 1997a), and a single holotype allows innumerable observations,
especially
DNA or photographs are available, precludes a number of studies.
when non-intrusive techniques such as radiograph or scanner are used. But lacking a holotype, even
when
Recent trends for opposition to collecting specimens are, at least, in the eyes of taxonomists and evolu-
tionary biologists, based on a ill-understood approach to "ethics", chosing ignorance in the name of
"conser-
vation", although it is clear that efficient conservation cannot be based on ignorance. This was a rarity a
few
years ago, when a student in a field research party could decide to release at night a specimen of a
new species
of salamander kept alive in a plastic bag (David Wake, personal communication to AD, about the
specimen of
the new species Bolitoglossa jacksoni shown in fig. 6 of the paper by Elias 1984). Nowadays, when
finding a
unique specimen of a lizard species considered extinct and rediscovered after 130 years, even a
professional
zoologist may decide to photograph and release it (Ineich 2006): what could have been in a rather
recent past
considered a professional misconduct is now more or less imposed by the "ethically correct" tyranny.
This is
part of a more general trend in which some students may now embark on higher studies in biology but
refuse
to kill specimens or to experiment on them. If this trend goes on, zoologists may be forbidden to collect
spec-
imens even in order to photograph them or take a feather or a drop of blood from them, in order not to
"dis-

turb" them. This would indeed remind the obscurantist medieval times when anatomists and physicians would
be forced to dungeon or to stake for having dissected human bodies.
Winker (1996) identified five causes for the opposition to collecting specimens for biodiversity studies: (1) focusing conservation at the level of the individual; (2) unfamiliarity with population biology; (3) misun-
derstanding of scientific research; (4) typological thinking, and (5) misplaced morality. Except for (4), all these factors are active in the opposition to collection and fixation of even a single specimen as holotype for a
new species, and should be countered by taxonomists.
When Vieilliard (1976) described the new Kabyle bird species Sitta ledanti, he collected, killed and fixed one adult male for holotype and one adult female for paratype, although he was then aware of the existence of
only a dozen of couples. No doubt if an ornithologist was doing this today, he would face difficult time with
"conservation biologists". Nowadays, although still threatened, this species is still alive and other populations
have been discovered (Bellatreche 1991, Doumandji & Kisserli 1993). However, the important point regard-
the
ing present discussion is that, if unfortunately this species had become extinct, the existence of one speci-
men of each sex in a museum collection was liable to provide major information on its morphology and anatomy which descriptions and illustrations alone could not provide. Taxonomists should care for obtaining
such basic, "minimum" material, for all new species they discover and will discover in the coming years and
decades.
The media and laymen are very excited everytime a new fossil species of dinosaur or humanoid, or a large
species of living mammal or bird, is discovered, but interest is much weaker for less "extraordinary" discover-
ies, especially of organisms smaller, more discrete, or less close to our own species. Zoologists and especially
taxonomists are not bound to share this approach, and may feel that any obscure mite or sea snail is as impor-

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to knowledge as a dinosaur. One way of making sure that discoveries of new species are transmitted to our descendants is not only to describe them but to keep voucher specimens in museums and other permanent
collections. Nomenclatural Rules, in obliging serious taxonomists to keep at least one specimen of each
described species, are a strong support for such an activity. The progress made in Article 16 of the last version
of the Code should be made more irreversible by making this article more stringent. The need of depositing an
onomatophore in a permanent public collection should be recognized for standard publications of species.
suggestions and recommendations in this respect for the future.

However, some of the problems mentioned above should also be addressed. We therefore provide below some
Proposals regarding the Rules of nomenclatural availability of nomina
Biology needs a universal and unambiguous language for the designation of taxa, and this language is pro-
vided by the codes of nomenclature. For a smooth and efficient functioning of these codes, some principles
must be respected (Dubois 2005: 375-378). An important principle is simplicity, especially the fact that Rules
are unique and general and contain as few exceptions and special situations as possible. In zoology, the current
Code contains already too many exceptions and particular cases (especially Rules that are valid only until a
certain date, or after a certain date), and if it was to be changed in this respect, this should be in the sense of
simplification and uniformisation, i.e., of suppression of exceptions and particular cases. It would therefore
not be appropriate to consider the introduction of special Rules for the availability of nomina, e.g., for "very
endangered species", for "very rare species", for "species difficult to collect" or for "extinct species known
only from iconographic documents". The same Rules should apply to all animal taxa, whether large or endan-
gered, rare or common, living or extinct. However, there should be room within these Rules to deal appropri-
ately with all specific cases and situations.
a
In our opinion, Article 16 should be made more stringent regarding the need of onomatophore deposition.
We think the major strength of the Code, and its superiority over alternative nomenclatural systems that have
been proposed, lies in its being based on onomatophores for allocation of nomina to taxa: this establishes
connexion between the world of organisms and that of language, and allows this allocation to be objective, not
based on interpretations of definitions. We think the need of material onomatophores (i.e., specimens, not
photographs, sound recordings or molecular sequences) for the availability (and hence validity) of zoological
nomina should now become even more stringent than in the past. This would insure not only to maintain this
objective reference for ascertaining the status of nomina, but also to make sure that at least one specimen of
every new species described in this century will be the matter of a legacy to our descendants. This does not
mean however that collection of specimens should be made blindly and without care for problems of species
conservation. Regarding the latter problems, we think two different approaches should be combined: (1) the
careful choice of specimens collected and fixed; (2) in some cases, the recourse to alternative approaches, i.c.,
delaying naming or naming through a specific action of the Commission.
The first way to conciliate the concerns for conservation issues with a Code requiring that at least one

specimen should be held and conserved in trust for science, is through the choice of this specimen. In most
cases, especially involving vertebrates, a male (preferably an older one, which has greater probability of hav-
ing reproduced and of not being able to do it again) should be preferably kept instead of a female, due to the
potential lower impact on the effective number of the population. In some other cases, when the sex ratio is
particularly skewed, the specimen should be taken among the most abundant sex, and if several widely differ-
ent phenotypes are observed, the most common one should be chosen.
Now, we have seen above that, in some cases, it is indeed useful to have the possibility to describe a new
species without having a specimen in hand. It might indeed be the case in some exceptional cases (although
not as a routine procedure) for species threatened with extinction but which might still survive if we do not fix

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men (e.g., a species for which only one couple would still be alive). It might be the case for some which are indeed (at least for the time being) impossible to collect or to conserve. Above all, it has and will certainly again be the case for species that are now (or are now believed to be) extinct, but for which illustrations or descriptions are available and informative enough to allow the proper description and
naming of a new taxon.
In such cases, two different situations must be distinguished. In the first one, the possibility exists to obtain later a specimen that could be deposited in a collection as onomatophore. This may be after more pre-
cise estimates of the number of alive specimens of the species have been obtained, ascertaining that they are
more numerous than initially thought, and allowing to collect one of them. This may be after recovery of an
initially very low population, with increase in its size. This may be after discovery of other populations of the
same species. This may be after permanent close watch of the relict population, allowing to collect one speci-
men after its natural death. This may be after techniques have been developed allowing to capture a specimen
although this had long been considered impossible (as in the case of Torquerator bullocki mentioned above).
In all these cases, it is certainly much better to wait for formally describing the new species until a specimen
has been collected and studied. This would avoid basic factual mistakes based on wrong interpretations of
photographs as in the example of Torquerator bullocki. This course is the one that had been suggested by
Timm et al. (2005) in the case of the monkey Lophocebus kipunji: "Jones and colleagues are encouraged to
acquire a specimen, or part(s) thereof, and prepare a new description of this, as yet, undescribed species".

This course raises only one problem, but a genuine one: the risk that (an)other author(s) than the discov-
erer(s) of the species take advantage of this absence of formal description to collect a specimen, describe and
name it to become "author(s)" of the new nomen. Although this is not much mentioned in textbooks, the his-
tory of zootaxonomy is full of similar examples, which indeed are a major plague of the discipline, as is well
known by all researchers in this field. Interestingly, in the many discussions that have been devoted in the
recent years to proposals of changes or improvements that should be brought to the current nomenclatural
Rules, few discussed this problem. As was very aptly pointed out by Ng (1994), the function of adding the
name of the author after the nomen of a taxon is not to please the author, "to promote the reputation of a scien-
tist or simply an egotistical exercise", but is to help "to keep track of authors, publication dates and to trace the
original references", through databases like the Zoological Record. Dubois (2000) discussed this matter and
suggested that mentioning only the publication year of the nomen, without the author(s)' names, would play
the same function and would help limiting artificial inflation of unwarranted nomina provoked mostly by
"mihilism", as Bruun (1950) ironically termed it. However, such a change would clearly threaten the
so many taxonomists that, although it may be highly desirable (Dubois submitted-b), it may not be easy to
implement, as highlighted by the fact that promoters of the Phylocode project, who could well have decided
not to add authors' names after their nomina, did not apparently consider doing so (Dubois 2005).
egos of
A second situation is that of species described on the basis of documents attesting the past existence of a
taxon that is now extinct and for which it is unlikely that fossil or subfossil material will be discovered. Such
unlikely events sometimes occur, as shown above by the case of the Mascarene turtle. A recent example is
quite enlightening: Oliveira & Langguth (2006) elegantly showed that the new monkey species described as
Cebus queirozi by Mendes Pontes et al. (2006) had already been described more than two centuries ago as
Simia flavia Schreber, 1774. However, such rediscoveries are exceptions and in most cases the species will
remain known only from the ancient documents and no specimen will ever be found. In such cases, it would
not be clever to impede their formal description and naming because of rigid nomenclatural Rules. So a spe-
cial solution must be found for such cases.
As mentioned above, there should be a single Code, not different Rules for different situations. We think
the Code already contains a provision that would allow the description of new taxa, in some very exceptional
cases, without material onomatophores. Article 10.1 of the current Code reads as follows:

"10.1. General conditions to be met. A name or nomenclatural act is available, and takes authorship and
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when it has satisfied the provisions of this Article and, when relevant, of Articles 11 to 20 (...). A be ruled to be available by the Commission (...) if these conditions are not fully met."
We think advantage should be taken of the last sentence of this article to solve the nomenclatural problem here addressed. In the exceptional cases where good reasons (as discussed above) would make it impossible to validly name a new taxon under the usual Rules of the Code, this could be done through submitting a special request to the Commission. This could take the form of submission of a manuscript for publication in the Bulletin of Zoological Nomenclature, the official journal of the Commission, followed by a vote of the latter to validate the new nomen (just like in the cases of normal applications submitted to the Commission for decision). This would be a heavy procedure, but one which would respect the current Rules of the Code. It should remain heavy in order to discourage "lazy" zootaxonomists to call upon it, as it should be used exceptionally, and not become a routine procedure. If nothing is done in this direction, it is not unlikely that in the coming decades all new species of primates, why not of mammals, why not of vertebrates, will be described on the basis of photographs or of DNA sequences taken from a hair, a feather or a drop of blood, without even a brief description of the organism, and without material onomatophores. For the reasons explained above, such a move would be very harmful to taxonomy in the future.

Conclusion

Voucher specimens play a crucial, although often misunderstood, role in modern taxonomic and evolutionary research. Among them, onomatophores ("name-bearing types") play a special function, being the objective references for the allocation of nomina to taxa. The Rules of the Code, which have been improved in the last edition in making compulsory the designation of a material onomatophore (one specimen or several specimens) for the availability of a new nomen, should also make compulsory the deposition of onomatophores in public collections. In the few exceptional cases where collection or conservation of a specimen is impossible (for difficulties of collecting or of keeping, for conservation reasons, or when the taxon is known only from ancient documents), choice should be made between two possible courses: (1) either preliminary description of the taxon through indirect evidence (photographs, DNA sequence, etc.), but without naming it, pending the

acquisition of an onomatophore and its deposition in a public collection, whenever this subsequent acquisition
is likely; (2) or formal description of the taxon and proposal of a new Latin nomen based only on photographs,
drawings, DNA sequence or other indirect evidence, but then in a paper submitted for publication in the Bul-
letin of Zoological Nomenclature, followed by a vote of the Commission to validate nomenclatural availabil-
ity of this new nomen under the provision of the last sentence of Article 10.1.
For implementation of these changes in the Code, we propose the following new wording for Article 16.4
(no changes are proposed in the four recommendations of this article):
"16.4 Species-group names: explicit fixation and deposition in public collections of name-bearing types. Every new specific and subspecific name published after 1999, except a new replacement name (a
nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...),
must be accompanied in the original publication
16.4.1. by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,
16.4.2 by its deposition in a collection or several, with a statement indicating the name and location of this
(or these) collection(s), or a statement that it or they will later be deposited there (see Recommendation 16C).
16 4.3. In the exceptional case where the holotype or syntypes cannot be collected and/or conserved (because the taxon is believed to be extinct, of difficulties or impossibilities of specimen collection or conser-
vation, or because the taxon is threatened with extinction), formal description and naming of the taxon should
be postponed until one or several specimens can be collected; if it is unlikely that any specimen will ever be
available for deposition in a collection, the taxon should be described and named on the basis of indirect evi-

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ancient document showing an illustration or presenting a description of the taxon, photograph,
ar data) in a paper submitted for publication in the Bulletin of Zoological Nomenclature, and formal
ility of this name should be voted upon by the Commission as allowed by Article 10.1."
To complete this change in Article 16, the following new wording should be implemented in Article 73.1.4:
-73.1.4. Designation before 2000 of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not
of itself invalidate the designation. (...)
We believe these proposed changes in the Code would allow to solve the problem raised in recent papers,
regarding the description and naming of new species without contributing to their extinction, but without opening the door for a routine description of new species without onomatophores, which would be very detri-
mental to taxonomy and to our knowledge of biodiversity
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reduce the impact on the species survivorship. Order of authorship of this paper is alphabetical.
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Does nomenclatural availability of nomina of new species or subspecies require the deposition of vouchers in collections?

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Abstract
Several species of birds and primates recently described opened a debate in the zoological community on the possibility
of naming new species or subspecies without material onomatophores ("name-bearing types") deposited in collections.
The current writing of the Code is ambiguous in this respect. We support here the view that such practice is not doing a
service to the discipline of taxonomy as illustrations, DNA sequences or "definitions" cannot replace voucher specimens
The latter are and will be badly needed for the proper knowledge of the vanishing biodiversity of our planet. We review
arguments pro and con the need to have a Rule in the Code requiring the deposition of onomatophores in collections for
the proper and valid creation of new nomina in zoological nomenclature. In conclusion, we propose a more drastic Rule

in this respect but also the possibility, in some exceptional cases, to apply to the International Commission on Zoological
Nomenclature to make nomina available even in the absence of material onomatophores.
Key words: Biodiversity crisis - Nomenclatural availability-Vouchers
Onomatophores - Collections -Illustra-
tions - DNA sequences
- Definitions
Code Commission
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Introduction

This paper discusses an important question of zoological nomenclature at the verge of the "century of extinc-
tions" (Dubois 2003): that of the nomenclatural availability and consequently validity of zoological scientific
names or nomina (Dubois 2000) published without onomatophores ("type-specimens"; see Dubois 2000,
2005) deposited in a collection. This problem has been raised recently for several species of vertebrates con-
sidered "rare and endangered". It is only one avatar of a new tendency in taxonomy, consisting in the descrip-
tion and naming of new taxa without voucher specimens, e.g., based only on molecular evidence, even when
no threat on the taxon is currently identified, or of taxa "defined" through "phylogenetic definitions" but with-
out vouchers or even diagnostic characters. Such problems may become more and more common if the strict
and clear Rules of the International Code of Zoological Nomenclature (Anonymous, 1999, "the Code" hereaf-
As it develops, the biodiversity crisis
ter) regarding nomen availability are not understood and adopted by all zoologists and scientific editors.
mainly caused by anthropogenic factors = will more and more
face zoologists with the ethical dilemma of sacrificing specimens potentially important for the survivorship of
their species in order to satisfy the minimum criteria established by the Code to make a new nomen available.
will go on and as new taxa
This situation already exists but will tend to become more frequent in the forthcoming years, as extinctions
- especially of vertebrates - will be discovered in isolated refuges, with small
relict populations and therefore highly threatened with extinction. Whereas some taxonomists aim to rely on
scientific objectivity and precision through the deposition of fixed reference specimens (onomatophores) in
public collections, some are also tempted to skip this procedure to give new discovered species with tiny pop-
ulations a better chance of surviving. However, the Code does not provide special conditions for describing
"endangered" species, and its Rules for the nomenclatural availability of nomina must be followed if the latter
are to be used validly to designate zoological taxa.

This problem concerning onomatophores is but one special example of a more general trend in recent sci-
entific literature dealing with systematics, phylogeny and evolutionary biology, where the important role of
vouchers is underestimated, if not ignored or denied (Funk et al. 2005). This is illustrated by the fact that some
major databases such as Genbank do not require the indication of voucher specimens associated with the
information they store (molecular sequences in the case of Genbank). The case of the classical cytological
studies in botany reminded by Funk et al. (2005: 127) is exemplary of what could be the fate of some of the
data in Genbank and other databases: "the absence of vouchers for literally thousands of early chromosome
a majority of all counts made prior to 1965- has rendered those data essentually worthless: the
identity of the plants cannot be verified. The enormous effort made by those early cytologists comes to little or
nothing at all."
counts
No rules oblige taxonomists to deposit vouchers when they describe a new species, simply because there
is no "code of taxonomy" for reasons detailed by Dubois (2005). However, as soon as not only describing,
but also naming is involved - a distinct process, which belongs in nomenclature, not in taxonomy proper-,
vouchers are necessary. Although the nomenclatural role of these special vouchers is particular (to provide an
objective standard for the allocation of nomina to taxa; see below), these specimens have also "incidentally"
an important taxonomic function, that of providing material references for the characters described by taxono-
mists. Because of this secondary, taxonomic, function of onomatophores, the Code so to speak fills a defi-
ciency caused by the absence of a code of taxonomy. Onomatophores are indeed very important vouchers for
the whole of evolutionary biology, and museums and other collections caring for their preservation in good
conditions play a major role in our understanding of biodiversity.
In the recent years, several zoological species were described as new without deposition of reference
specimens in collections, because these species were considered by their discoverers too endangered to allow
collection of even a single specimen without increasing their risk of extinction. Examples include the bird
Laniarius liberatus (Smith et al. 1991) and several primates: the mangabey Lophocebus kipunji (Jones et al.

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2005), later made the type of a new genus (Davenport et al. 2006); the lemur Avahi cleesei (Thalmann & Gei-

ssmann 2005); and the capuchin Cebus queirozi (Mendes Pontes et al. 2006). These cases have been in the
center of a contentious debate on the need for keeping dead specimen holotypes for establishing the nomina of
new animal species. Whereas some authors (Timm et al. 2005, Landry 2005, Oliveira & Langguth 2006)
stated that the nomina of these taxa, if published after 1999, are nomenclaturally unavailable, others (Wake-
ham-Dawson et al. 2002, Polaszek et al. 2005) defended the opposite idea. Similar situations, although in
these cases not caused by threats on the species but on "rarity" of species and difficulties in collecting them,
were recently encountered in several cases of descriptions of new species based on DNA sequences only,
without onomatophores, for example in whales (Dalebout et al. 2004, and references therein), and these cases
were also taken as flag examples for a plea for "modern" nomenclature that could supposedly be "freed" from
the constraint of depositing dead specimens in collections (Dalebout & Baker 2002): "Due to the declining
abundance of many species, access to complete anatomical specimens is becoming a vanishing luxury. (...)
For many animal taxa, the lethal collection of such voucher specimens would now also be considered unethi-
cal." (Dalebout et al. 2004: 459).
Interestingly, this new trend meets another recent one in biological nomenclature, illustrated by the pro-
moters of nomenclatural systems alternative to the current codes, where allocation of nomina to taxa is not
based on onomatophores but on so-called “phylogenetic definitions". As discussed in detail elsewhere
(Dubois 2005, 2006b), a basic problem (among others) of such nomenclatural systems is that they miss the
material connexion between language and specimens realized by onomatophores.
Our aim in this paper is to explore again this question in the light of the current Code and of other consid-
erations.

Nomenclatural availability of nomina

Dubois (2005) distinguished three steps in the nomenclatural process required to establish the valid nomen of
a taxon in zoology under the Rules of the Code: availability of nomen (through publication and respect of pre-
cise criteria), allocation of nomen to taxon (through onomatophore) and validity of nomen (through priority).
These three "floors of the nomenclatural house" must be explored successively. Regarding the first floor,
availability, Dubois (2000) recognized two categories of nomina: hoplonyms are nomina published through
respect of all Code's criteria of nomen availability, whereas anoplonyms are nomina published but not respect-
ing all these criteria, and therefore nomenclaturally unavailable (i.e., "non-existent" in zoological nomencla-
ture). Criteria of availability are mostly described in Chapter 4 (Articles 10 to 20) of the Code, but also in
Chapter 1 (Articles 1 to 3) of the latter. The term nomen nudum (gymnonym in Dubois 2000) designates only a

subcategory of the category of anoplonym, as the "Glossary" of the Code (p. 111) defines it as a nomen "that,
if published before 1931, fails to conform to Article 12; or, if published after 1930, fails to conform to Article
13". To be an anoplonym, a nomen just has to fail to conform to any of the Articles 1-3 and 10-20, so this
covers a much wider array of cases than the category of nomen nudum.
It is important to realize that the Rules for nomen availability have changed through time, and these Rules
nowadays are much more stringent than in the past. Today, practising taxonomists are following these Rules,
not those of the past. Importantly, Article 16 is new, and it introduces important changes compared to the pre-
vious edition of the Code (Anonymous 1985). Let us review the Rules of the Code regarding nomen availabil-
ity.
Chapter 1 ("Zoological nomenclature") provides general Rules for admissibility of nomina covered by the
Code: nomina failing to conform these Rules are therefore anoplonyms. Article 1.1 states that zoological
nomenclature only covers nomina applied to taxa of extant or extinct animals, which excludes oganisms
referred to other kingdoms. Article 1.3 expressly excludes from zoological nomenclature several categories of

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nomina, in particular proposed "for hypothetical concepts" (Art. 1.3.1) or "after 1930, for the work of extant
animals" (Art. 1.3.6). The "Glossary" of the Code (p. 101) defines "hypothetical concept" as follows: "A tax-
onomic concept that when published contained no animal then known to exist in nature, past or present, but
only in the mind of the author whether a prediction or not". This sentence is strangely written, as a concept
cannot "contain" an animal, but "refer to" or "designate" it. The French version of the "Glossaire" (p. 235)
proposes a more accurate definition of "concept hypothétique", as it mentions that such a concept "n'est pas
nomina and nomenclatural acts published before 1758.
basé sur un animal (...)" ("is not based on an animal"). Article 3 excludes from zoological nomenclature all
Chapter 4 ("Criteria of availability") lists all criteria which must be met for a nomen to be available in
zoological nomenclature. For the purpose of the present discussion, we will briefly survey most of these con-
ditions and only outline a few of them. Articles 10 and 11 present general conditions of availability, in partic-
ular regarding the need of publication and the formation of nomina. Article 12 presents special requirements
that only apply to nomina published before 1931: any such nomen "must be accompanied by a description or

a definition of the taxon that it denotes, or by an indication" (Art. 12.1), and Art. 12.2 defines precisely the meaning of the term "indication". Article 13 concerns nomina published after 1930, and requires that they "be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon", or refers to such a published statement, or be proposed as a nomen novum (neonym in Dubois 2000) for an already available nomen. Article 14 excludes from zoological nomenclature nomina published anonymously before 1950, and Article 15 excludes nomina published conditionally, or for taxa given the ranks "variety" or "form", after 1960. Articles 17 to 20 provide special Rules concerning availability of nomina in a few particular situations (e.g., nomina applied to taxa of hybrid origin, tautonymous nomina or subsequent spellings of nomina).

All the preceding articles existed, in similar or slightly different forms, in the past editions of the Code until the so-called third one (Anonymous 1985), and none of them mentioned the need, for availability of nomina, of the existence of an onomatophore (holotype, syntypes, lectotype or neotype). However, an important change was brought to the Code in Article 16 of the fourth edition (Anonymous 1999), which added several requirements for availability of nomina published after 1999. These new requirements include the need of an explicit statement of the intention to establish a new nominal taxon, the need to mention the type genus of a new familial nomen, and, above all, the need of fixation of the onomatophore for any new specific or subspecific nomen. As this part of Article 16 will be in the center of the discussion below, it is better to provide a large quote of it, including some of its Recommendations:

"16.2. Family-group names: type genus to be cited. (...) a new family-group name published after 1999 must be accompanied by citation of the name of the type genus (...).

16.4 Species-group names: fixation of name-bearing types to be explicit. Every new specific and subspecific name published after 1999, except a new replacement name (a nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...), must be accompanied in the original publication

16.4.1 by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,

16.4.2 where the holotype or syntypes are extant specimens, by a statement of intent that they will be (or are) deposited in a collection and a statement indicating the name and location of that collection (see Recommendation 16C).

Recommendation 16C. Preservation and deposition of type specimens. Recognizing that name-bearing types are international standards of reference (see Article 72. 10) authors should deposit type specimens in an institution that maintains a research collection, with proper facilities for preserving them and making them accessible for study (i.e. one which meets the criteria in Recommendation 72F).

Recommendation 16D. Publication of information distinguishing type specimens. When providing

information to distinguish the type specimen(s) from other specimens (Article 16.4.1) authors should include
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data recommended).
information such as specimen numbers and descriptions of labels (see Recommendations 73C and 73D for
Recommendation 16E. Preference for holotype over syntypes. Whenever possible, authors should select a holotype rather than syntypes.
Recommendation 16F. Illustrations of type specimens. Whenever possible a holotype or syntypes is established."
should be illustrated, showing characteristic features of the taxon, in the work in which the new nominal taxon
Also relevant for this discussion are the following Articles:
"72.2. Fixation of name-bearing types from type series of nominal species-group taxa established before 2000. A nominal species-group taxon established before 2000 may have its name-bearing type fixed
from the type series (...) originally (...), or subsequently (...). (If no name-bearing type is believed to be extant
a neotype may be fixed; see Article 75 for conditions).
72.3. Name-bearing types must be fixed originally for nominal species-group taxa established after 1999. A proposal of a new species-group taxon after 1999 (unless denoted by a new replacement name
(nomen novum) (...), must include the fixation of a holotype (...) or syntypes (...). In the case of syntypes,
only those specimens expressly indicated by the author to be those upon which the new taxon was based are
fixed as syntypes.
(...)
72.5. Eligibility as name-bearing types. Only the following are eligible to be a name-bearing type, or part of a name-bearing type, or a nominal species-group taxon:
72.5.1. an animal, or any part of an animal, (...);
72.5.6. In the case if a nominal species-group taxon based on an illustration or description, or on a biblio-
graphic reference to an illustration or description, the name-bearing type is the specimen or the specimens
illustrated or described (and not the illustration or description itself).
(...)
72.10. Value of name-bearing types. Holotypes, syntypes, lectotypes and neotypes are the bearers of the
scientific names of all nominal species-group taxa (and indirectly of all animal taxa). They are the interna-
tional standards of reference that provide objectivity in zoological nomenclature and must be cared for as such
(...). They are to be held in trust for science by the persons responsible for their sage keeping.
Recommendation 72D. Labelling of name-bearing types. Holotypes, syntypes, lectotypes and neotypes should be labelled in a way that will unmistakably denote their status.
Recommendation 72E. Publication of information on labels. An author who designates a holotype, lectotype, neotype or syntypes should publish all information that appears on the labels accompanying the

specimens so as to facilitate the future recognition of the specimens.
Recommendation 72F. Institutional responsibility. Every institution in which name-bearing types are deposited should
72F.1 ensure that all are clearly marked so that they will be unmistakably recognized as name-bearing types;
72F 2 take all necessary steps for their safe preservation,
72F.3 make them accessible for study;
72F4 publish lists of name-bearing types in its possession or custody, and
72F.5 so far as possible, communicate information concerning name-bearing types when requested.
(...)
73.1. Holotypes. A holotype is the single specimen upon which a new nominal species-group taxon is based in the original publication (...).
73.1.1. If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one, is the holotype, or 'the type', or uses some equivalent expression, that

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specimen is the holotype fixed by original designation. (...)
73.1.4. Designation of an illustration of a single specimen as a holotype is to be treated as designation of
idate the designation. (...)
the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not of itself inval-
Recommendation 73C. Data on the holotype. An author who establishes a new nominal species-group taxon should publish at least the following data concerning the holotype, if they are relevant and known to the
author: (...)
73C.6 the collection in which it is situated and any collection number or register number assigned to it, (...)"
Changes in the Code regarding the nomenclatural function of onomatophores
Before discussing the problem addressed by the papers mentioned above, it is useful to clarify the nomencla-
tural function of onomatophores ("name-bearing types"). One often reads that these specimens "provide
objectivity in zoological nomenclature" (e.g., Art. 72.10 of the Code quoted above). This is true, but needs
more precise qualification. The function of these specimens is not, as some have construed it (e.g., de Queiroz
& Gauthier 1990, 1994; Pennisi 2001; Joyce et al. 2004; Sluys et al. 2004), to provide characters that would
allow to define the taxon to which the nomen is applied: this would rely on a typological conception of taxon-
omy which is outdated and that few recent taxonomists would support (Dubois 2005). The definition of taxa is
not a matter of nomenclature but a matter of taxonomy, and the Code does not deal with taxonomy but with
nomenclature. The Code does not provide rules or guidelines for defining taxa, but Rules for naming taxa
once they have been defined. To avoid such basic confusion, extirpation of the term "type" of its derivatives

from the vocabulary of nomenclature would be useful (Dubois 2005) and this is why we here use the term
onomatophore (Simpson 1940) for "name-bearing type" in the Code.
The main role of onomatophores under the Code is to provide an objective connexion between the world
of specimens (and, through them, of natural populations of organisms) and the world of language (Dubois &
Ohler 1997a-b). It allows allocation of a nomen to a taxon or several taxa. A given nomen applies potentially
- in fact, it only applies to a single taxon or a few taxa, because
to any taxon that includes its onomatophore-
of the existence of several nominal-series and of the Rule of Coordination (for details see Dubois 2006b and
and that is all. This function of onomatophore (bearing the nomen) pertains in the second submitted-a)
floor of the nomenclatural house (nomen allocation) and has nothing to do with availability of nomen. Until
1999, no Rule existed requiring the designation of an onomatophore for availability of a nomen, and Rules
allowed subsequent fixation of onomatophores for nominal-taxa first created without onomatophores (at least
in the species and genus nominal-series). The 1999 edition of the Code introduced a new function for ono-
matophores, in requiring their designation for a nomen to become available. This is an important change,
highly welcomed by taxonomists (see below), but which does not imply that onomatophores, as such, are used
to provide the characters of the taxa denoted by the nomina. "As such" means that, beside their nomenclatural
function of onomatophores, the same specimens, which are part of what the Code calls the series of "type
specimens", but which is better designated as the hypodigm (Simpson 1940, Dubois 2006a), also have a taxo-
nomic function, which is to provide characters that will be used to build up a taxonomy (nowadays often
through the formulation of a phylogenetic hypothesis).
In the 1985 Code, explicit designation of an onomatophore was compulsory for nomen availability only
for nomina of the genus-series, as Article 13.b required that such a nomen created after 1930 "be accompanied
by the fixation of a type species". The 1999 Code is much more consistent in this respect, as its Article 16.2
requires that new family-series nomina created after 1999 "be accompanied by citation of the name of the type
genus", and its Article 16.4 provides a similar Rule for species-series nomina (see below). Such Rules are

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as
md most welcome, because they clearly point to the Principle of Onomatophores as the basic prin-
for allocation of nomina to taxa in the Code. This is a major difference with other nomenclatural systems

those supported by proponents of various systems of "phylogenetic nomenclature", and this is the main reason why both kinds of nomenclatural systems are incompatible and cannot be "reconciled" or "mixed"
suggested by some (e.g., Kuntner & Agnarsson 2006). This is also the major reason for superiority of the
Code over these alternative systems, as it maintains a permanent link between specimens and nomina and is
therefore not an internal system within language, and as it allows nomenclature to remain theory-free regard-
(Dubois 2005 and submitted-a).
ing taxonomy, and therefore liable to adapt to new taxonomic paradigms that might develop in the future
For the availability of nomina, the last edition of the Code now requires "fixation" of onomatophores. "Fixation" means that, to be available, a new nomen must have been created associated with the fixation or
designation of a holotype or syntypes. By itself, this statement simply requires this designation, but not clearly that the onomatophore be preserved after designation and description, as will be discussed below.
Why was this important change brought to the Code? No explanation was provided in this respect in the
"Introduction" of this edition (Ride 1999), although this text spent space tackling other minor questions or
points that were not yet in order at the time of its publication (such as the eventuality of "replacing 'publica-
tion' as a primary determinant of availability", a very questionable idea indeed). We can see two immediate
reasons for supporting this major change: (1) requiring the designation of onomatophores avoids the introduc-
tion into nomenclature of nomina based on "hypothetical concepts", as defined above; (2) it avoids the cre-
ation of "phantom nomina", as defined by Vences et al. (1999). These points will be further clarified and discussed below, but it should be clear already that, if these two reasons are indeed behind the change in this
article of the Code, simple consistency would require that onomatophores be not only designated but also pre-
served, as otherwise none of these two problems would be solved.
As a matter if fact, there is an apparent contradiction between Articles 16.4.1 and 16.4.2 of the new Code.
Article 16.4.1 requires the explicit fixation of an onomatophore for any new species-series nomen to be avail-
able. A common sense interpretation of this Rule is that this fixation of the onomatophore must always be fol-
lowed by its deposition in a public collection, all the more that Article 72.10 states that such specimens are
"international standards of reference" that "are to be held in trust for science". This would mean that nomina
created on the basis of an illustration, without real specimen, would be anoplonyms if published after 1999.
However, this interpretation is not straightforward. Article 16.4.2 starts with the words "where the holotype or
syntypes are extant specimens" - which means that they may not be extant specimens, and therefore may not

be deposited in a collection. Polaszek et al. (2005: 2165) recognized that the current wording of Article 16 of the Code is ambiguous and should be made clearer, since they wrote: "The well-intentioned reactions of Landry and Timm et al. show that the current Code is open to different interpretations on the subject of type specimens". What can be these "different interpretations"?

According e.g. to the Oxford Dictionary (Thompson 1995: 476) "extant" means "still existing", and the "Glossary" of the Code (p. 104) also defines it as "still in existence". The first part of Art. 16.4.2 thus suggests that the holotype or syntypes may not be still in existence without impeding nomenclatural availability. There seems to be three possible reasons why it could not be the case: (R1) the specimen was examined by the describer, then killed, fixed and deposited in a collection, but later destroyed, lost or misplaced, so that it had disappeared at the time of publishing the description; (R2) it was examined alive by the describer, but then escaped or was set free before publication of the description; (R3) it was described only from indirect evidence (drawing, photograph, description, traces, etc.), but it has never been in the hands of the describer. The first case (R1) must be extremely rare in the case of nomina created after 1999, as it is unlikely that a specimen was killed, deposited in a collection, and destroyed or lost just after, before publication of the description, in a period of a few years. In contrast, both the second and third possibilities may apply to nomina created after 1999 and covered by Article 16.4.2 if the current Code.

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Polaszek et al. (2005) and others interpreted this article as meaning that a species can be named without depositing an onomatophore in a collection. This interpretation (11) is supported by Article 73.1.4, which states that, even after 1999 (as no mention of a limiting date is made in this article), an illustration may be designated as onomatophore of a new taxon, and that "the fact that the specimen no longer exists or cannot be traced does not of itself invalidate the designation". With this interpretation, the mention of the possibility to create a new nomen without "extant specimen" almost amounts to a return to the situation before 1999 and largely nullifies the progress introduced in the Code by Article 16.4.1. It still allows nomina to be created entirely within language, without objective reference to specimens, and is therefore a half-way measure which seems questionable. Under this interpretation, the post-1999 nomina mentioned above (Lophocebus kipunji, Avahi cleesei and Cebus queirozi) are hoplonyms (nomenclaturally available).

However, another interpretation (12) of this article is possible. Under this reading, the case (R3) above

would be acceptable, but not the case (R2). In the latter situation, the species was described on the basis of a living, therefore then "extant" specimen, and Article 16.4.2 would therefore require its deposition in a collection, or statement of intent of such a deposition. Under such an interpretation, it is not acceptable to release this specimen free, as this would contravene the dispositions of this article. Therefore, description of a new species based on a living specimen would allow availability of nomen only if the specimen is, or will later be, deposited in a collection. Under this reading of the Code, the latter would give no license to release a holotype after capture, description, photograph and possibly taking off a sample of blood, feather or hair for DNA analysis. If this is accepted, the three nomina listed above (and others in the same situation) are anoplonyms (nomenclaturally unavailable).

As recognized by Polaszek et al. (2005), the current writing of Article 16 does not allow by itself to choose between these two interpretations. The choice by Wakeham-Dawson et al. (2002) and Polaszek et al. (2005) of interpretation (I1) seems to be based on two widely different elements. The first one is Article 73.1.4, which, as mentioned above, allows designation of a figured specimen as onomatophore without limiting date (i.e., even after 1999). If interpretation (12) was considered valid, then Articles 16 and 73 would be in contradiction. The second element is the fact that interpretation (11) is supported by current and past members of the International Commission on Zoological Nomenclature ("the Commission" hereafter), including its current (Andrew Polaszek) and preceding (Philip Tubbs) Secretaries, so it would seem to correspond to the "intention" of the authors of the current edition of the Code, who did not wish to make deposition of a holotype in a collection compulsory for nomen availability. However, when "juridical" texts like the Code are concerned, the intention of the draftsmen is of little importance, what counts is the final text. The current text being ambiguous, it should be clarified in the next edition of the Code by adding some precisions. It can be so in two different directions.

If the aim is to support interpretation (11) above, a single change is required: (C1) a second part should be added at the end of Article 16.4.1, stating that "this or these specimen(s) may be extant or not".

If the aim is to support interpretation (12) above, three changes should be brought to the present Code. (C2) Article 16.4.1 should be written as follows (or an equivalent writing): "by the explicit fixation of one or several extant specimen(s) as holotype or syntypes..."; (C3) the first 8 words of Article 16.4.2 should be suppressed and this article should start with "by a statement..."; (C4) Article 73.1.4 should start with the words (or equivalent): "For nominal taxa created before 2000".

Until changes are brought to the current writing of the Code in either of these two directions, the ambigu-

ity described above will remain, but as the current officers of the Commission are not in favour of forbidding
description of a new species without an onomatophore, they are likely to "impose" their interpretation to the
international community of taxonomists. Under this interpretation, there is no contradiction between Articles
16 and 73, whereas under the interpretation (12) these two articles are not consistent, and one of them, at least,
should be changed.
Thus, under interpretation (11), favored by the Commission, the current Code allows to create a new

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appropriate? Let us explore this question in more detail.
nomen without an extant specimen, especially if an illustration of this specimen exists. Is such a Rule indeed
Illustrations as onomatophores
In botanical nomenclature (McNeill et al. 2006), the onomatophore of a specific or infraspecific nomen can be
either a specimen or an illustration (Art. 8.1). In the latter case, the botanical code makes it quite clear that the
onomatophore is the illustration, not the specimen shown by the latter, although it is recommended to go back
to material specimens for nomen allocation: "When a holotype, a lectotype, or a neotype is an illustration, the
specimen or specimens upon which that illustration is based should be used to help determine the application
of the name" (Art. 8.1). Such Rules have an important consequence: as the illustration itself is the onomato-
neotype for the taxon.
phore, the fact that the specimen on which the illustration was based is now lost does not allow to designate a
The situation is different in zoology. According to the Rules of the current Code, the status of illustrations
as basis for the creation of new zoological nomina depends on the date of publication. For nomina published
before 1931, one possible "indication" that can be used to make them available is defined as follows in Article
12.2.7: "the proposal of a new genus-group name or of a new species-group name in association with an illus-
tration of the taxon being named, or with a bibliographic reference to such an illustration". Therefore, before
1931, a new nomen could be created even without a verbal description or definition of the taxon for which it
was intended. This is no more possible after 1930, as after that year Article 13.1.1 requires that a nomen "be
accompanied by a description or definition". However, in this article it is not stated that an author must have
had a specimen in the hands to write a description or indication, and the latter may well have been prepared on

the basis of an illustration. The new Article 16 does not suppress this possibility. It just requires an explicit
fixation of an onomatophore, but not clearly that this specimen be "an extant specimen". This is further con-
firmed in Article 73.1.4 copied above.
There is a basic difference between the botanical and zoological codes as concerns the status of illustra-
tions as onomatophores. In contrast with the botanical code, the zoological code makes it clear that the ono-
matophore is the specimen(s) figured, not the illustration itself. This has an important consequence regarding
the situation, which is rather common when old illustrations are concerned, where the specimen(s) used as a
basis for the illustration is/are now lost or destroyed. In such a case, the onomatophore is no longer extant,
which opens the possibility to designate a neotype for the taxon if the conditions of Article 75.1 are met, i.e.,
when "an author considers that a name-bearing type is necessary to define the nominal taxon objectively".
This is a very useful particularity of the Code. In particular, it allows to settle at best the nomenclatural status
of nomina created in old works on the basis of syntypes consisting in several specimens and/or illustrations,
especially when these were of different origins and likely to belong in different taxa. One possible procedure
in such cases, used e.g. by Kottelat & Lim (1993), Dubois & Ohler (1995) and Kottelat & Persat (2005), and
illustrated and explained in detail in Dubois & Ohler (1997a-b), is to solve the ambiguity attached to the
nomen by a nomenclatural action involving two distinct steps: first, to designate as lectotype one of the speci-
mens figured, which can allow for example to restrict the type-locality of the taxon and to eliminate the other
syntypes from the onomatophore; and then, taking advantage of the fact that this specimen is no more extant,
to designate a neotype from the same locality.
So, despite its new Article 16.4.1, the current Code still apparently leaves open the possibility to create a
new nomen on the basis of an onomatophore shown in an illustration but not available nowadays for study,
i.e., a virtual or missing specimen. Clearly, some authors are in favour of this system, and others not. Let us
consider the pros and cons of this system.
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Arguments for and against basing nomina on virtual or missing specimens
Favourable arguments
(1) The conservation issue
The first argument in favour of accepting availability of nomina even in the absence of extant onomato-
phore deposited in collections is of course the "conservation" one. It does not seem adequate to collect and kill

even a single specimen of a species that, at the very moment of its discovery, appears to be on the verge of
extinction. This reason was given by the authors of the primate and bird nomina mentioned above to describe
these species without material onomatophores.
This argument in fact contains two different aspects. The first one is that it is genuinely believed by these
biologists that capturing and fixing even a single specimen of such species may indeed have a major impact
on the survival of the latter. This will be further discussed below. The second one is in fact quite distinct: it is
that killing a specimen of such an endangered species would certainly not be understood by conservationists
and more largely by "the public". Such a behaviour would appear "irresponsible" to these people, and, above
all, would contribute to give a bad image of taxonomists to outsiders of the discipline of taxonomy. As the lat-
ter is already poorly understood and appreciated among biological sciences, and, by way of consequence,
severely underfunded and much too short in professional positions (Dubois 2003, Wheeler et al. 2004), any
action that might contribute to undermine its image should be avoided by all means. Although they rarely state
it clearly, this second motivation might be more important than the first one for taxonomists who decide to
describe new species without fixed specimens.
(2) The difficuty or impossibility of collecting or conserving specimens
Some material reasons may make it very difficult or virtually impossible to collect or preserve specimens
of a new species. This is in particular the case of some marine organisms, especially of very large size (such as
some cephalopods or cetaceans) or living in deep habitats. Some of these organisms may be observed and
photographed, e.g. from a deep-sea submersible, but not collected. Should taxonomy be deprived from deal-
ing with such organisms because taxonomists cannot have them in the hands? In such cases, it could appear
that naming such taxa on the basis of photographs alone is justified. This point will be discussed further below.
A related case would be that of organisms which for some reason, after collection, cannot be conserved in
such a way as to allow their subsequent study. However, this case seems to be mostly a theoretical possibility
as, although some organisms are more difficult than others to fix and conserve properly, it is usually possible
to find appropriate, even if unusual, modes of conservation for them.
(3) Descriptions based on ancient illustrations
This case might be the most convincing one for the formal description of species without having actual
specimens in hands. Ancient iconographic documents are sometimes used by some taxonomists to provide
evidence that the specimens which were used to produce these illustrations belonged indeed in unknown, or at

least undescribed and unnamed, zoological species. This may even in some extreme cases be possible using
solely descriptions in words, without illustrations, when these descriptions are detailed enough, and appar-
ently accurate enough, to warrant such conclusions.
A good example of this situation is the formal description and naming by Bour (1978) of a new tortoise from the Mascarene, based on illustrations published in 1737 that were precise enough to allow ascertaining
the diagnostic characters of this species, which had become extinct around 1840 as a result of man's exploita-
tion (Bour 1984), and which was until then known only by imprecise descriptions of travellers. Interestingly,
this description prompted the discovery of subfossil remains of the same species, which allowed a more com-

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plete redescription (Bour 1979), and later to show that this species was in fact the one that had been originally
named Testudo indica Schneider, 1783 on the basis of a holotype, still extant, but which had been considered
for two centuries of unknown origin (Arnold 1979, Austin et al. 2002). Such exceptional discoveries will no
cies because no specimen is available.
doubt remain possible in the future, and it certainly would not be appropriate to forbid the naming of such
spe-

Unfavourable arguments

(1) Hypothetical concepts

The Code expressly excludes from its domain nomina proposed for animals not known with certainty to exist or to have existed in nature, "but only in the mind of the author whether a prediction or not". This defini-
tion may seem clear, but needs further information to become operational. The only way to be sure that an ani-
mal does not exist only in the mind of a person is to be able to examine a specimen. Such nomina can well be
"defined", even "phylogenetically", but they may not correspond to any organism in the real world. A striking
example is provided in a paper where many hypothetical groups of amphibians were defined (Lescure et al.
1986), based on phylogenetic hypotheses that were not supported by subsequent works (Nussbaum & Wilkin-
son 1989), so that these taxa fully correspond to the notion of "hypothetical concept" as defined in the Code.
As discussed below, a photograph by itself cannot be used as an objective proof of the existence of an ani-
mal, and a verbal description or a testimony, even if supported by several witnesses, cannot qualify as a scien-
tific evidence, for several reasons spanning from observations that are inaccurate (although honest) due to

various material reasons, to deliberate falsification or pure invention. Good examples of such problems are
those posed by the various "mythical animals" that have been "seen", sometimes by many "witnesses", but for
which material evidence is still missing, such as the abominable snowman and its avatars (yeti, migu, bar-
manu, sasquatch, etc.), the Loch Ness monster and various "sea snakes" and other marine monsters. Most of
these stories are purely verbal, but some "material documents" indeed exist, such as "photos" of the Loch
Ness monster or of the sasquatch, or recordings of the voice of the Caucasian barmanu, which all have in com-
ment to be of "bad quality" (photos out of focus, recordings with noisy background, etc.).
In a few cases, Latin nomina were indeed proposed for such "animals", despite the absence of specimens,
but on the basis of testimonies, descriptions, traces such as footprints, hair or "scalp", or even photographs.
An interesting case is that of the "iceman" formally described and named Homo pongoides on the basis of a
specimen purported to have been examined through ice in an itinerant circus, but which later "disappeared",
and for which several photographs and drawings were published (Heuvelmans 1969, Heuvelmans & Porchnev
1974). What can science do with such "descriptions" and nomina? How can the criterion of Article 1.3.1 for
exclusion of "hypothetical concepts" be applied? Is the nomen Homo pongoides a hoplonym or an anoplo-
nym, and, if it is a hoplonym, what is its status? Valid nomen, synonym, nomen dubium? If deposition of a
specimen in a public collection was compulsory for availability of new nomina, such a question would not be
raised, and formal description would have to await capture of a specimen or discovery of remains attributed to
this "taxon".
(2) Phantom nomina
This concept was coined by Vences et al. (1999) for new nomina "accidentally" published without proper
descriptions and identified vouchers in amateur publications or animal shop catalogues dealing with animal
groups that attract many hobbyists (in their case brightly colored frogs of the genus Mantella Boulenger,
1882), on the basis of photographs of live specimens later sold to customers. These authors discussed the
major problems posed by the proper allocation of such nomina to taxa, then wrote "editors of hobbyist jour-
nals should not permit their authors usage of new scientific names to name undescribed or undetermined mor-

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phs unless the names are accompanied by a formal description and type specimens are deposited in a publicly

available scientific collection" (Vences et al. 1999: 56). For many taxonomists who work on such "attractive"
animal groups (e.g., insects, molluscs or vertebrates kept alive by aquariophilists and terrariophilists), the new
edition of the Code was received with relief, as the common sense interpretation of the new Rule of Article
16.4.1 is that it now imposes the deposition of onomatophores in public collections for new nomina to be
nomenclaturally available. But as this interpretation is not supported by Articles 16.4.2 and 72.5.6, nor by
officers of the Commission, taxonomists working on such groups should remain vigilant and expect new problems similar to those described by Vences et al. (1999).

(3) Photographs as scientific evidence

There is a widespread but unfounded belief that photographs are "better scientific evidence" than mere written descriptions or even drawings or paintings. There are several reasons why this belief is unfounded

First, photographs have always been liable to be falsified, and faked photographs have indeed been used in
many occasions, from political propaganda to commercial or juridical affairs, including science. A recent example in zootaxonomy concerns the new species of coelacanth from Indonesia described as Latimeria
menadoensis (Pouyaud et al. 1999), but for which shortly after a faked photograph was submitted for intended
publication in Nature (McCabe & Wright 2000). Nowadays, with digital photographs, faking has become even easier and virtually undetectable, and photographs should not be considered reliable proofs by them-
selves for anything. Faking is also possible with specimens, of course, but such falsifications, whether simple
hoaxes or intended to promote particular ideas or to support a personal's carrier, are usually discovered later
on by careful examination of the material, as was the case, e.g., for the "Piltdown man" (Weiner et al. 1953),
but such deceptions may be more difficult to demonstrate with digital photographs.

But faking is not the only reason why photographs are not the best way to know the characters of biologi-
cal species. Characters are not "facts" that would not depend on the subjectivity of observers. They are inter-
pretations of reality, usually based on a given "reading" by man of the phenotypes of organisms. They depend
on scientific judgements and decisions concerning homology, similarity and difference. In this respect, descriptions using words, or scientific drawings, are more informative, because they highlight some features
and ignore others, that are considered of no or little relevance for the characterisation of a taxon. In contrast,
the implacable objectivity of photographs, which capture in the same manner basic and "meaningless" charac-
ters of the specimens, or even sometimes artificial details such as shadows and lights - except, once again, if
photographs are modified to show special features, but then we come back to the problem above, does not
provide as much help to taxonomists.

Even with the best goodwill, study of photographs for taxonomic work implies the risk of misinterpreting

some characters, of missing others, and sometimes of "inventing" still others. An enlightening example of the
latter situation is provided by the recent decription of the new taxon Torquerator bullocki (Holland et al. 2005). This organism belongs in a group of deep-sea hemichordates that were known from photographs but
had not been previously collected. On the basis of the interpretation of the photographs taken by submersibles,
where these worms appeared to have collar tentacles, these organisms had been considered a missing link (the
so-called "lophenteropneusts") between two main hemichordate body plans, the enteropneusts and the ptero-
branchs (Lemche et al. 1976), and this in turn had influenced ideas about the origin of vertebrates. Collection
and study of a specimen of this group showed that these interpretations were wrong. "The collar, although dis-
proportionately broad, lacks tentacles. In addition, we find no evidence of tentacles in the available deep-sea
photographs (published and unpublished) of broad-collared enteropneusts, including those formerly desig-
nated as lophenteropneusts. Thus, the lophenteropneust hypothesis was based on misinterpretation of deep-sea
photographs of low quality and should no longer be used to support the idea that the enteropneust body plan is
basal within the phylum Hemichordata." (Hammond et al. 2005: 374). In this case, it is therefore fortunate
that Lemche et al. (1976) were prudent enough not to publish a formal description and naming of these organ-

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isms on the basis of photographs alone, as the Latin nomina that could have been created for this purpose
would have turned out to be anoplonyms, being based in fact on "hypothetical concepts". In fact and more
exactly, they wrote that the nomen Lophenteropneust was "intended to cover a group above the family level
and thus no subject to the rules of nomenclature" (Lemche et al. 1976: 292), so that if in the future class-series
nomina are incorporated into the Code (Dubois 2006a) the status of this nomen will have to be settled.
There is no need to turn to deep-sea organisms to encounter problems with descriptions of new taxa based
only on photographs. Examples of such problems, discussed by Pauwels & Meirte (1996) and Pauwels &
Chérot (1997), include the description of the "Loch Ness monster" as Nessiteras rhombopteryx by Scott &
Rines (1975), that of Cryptophidion annamense by Wallach & Jones (1992) and that of Cadborosaurus willsi
by Bousfield & Leblond (1995). These cases, and several other ones, belong in the domain of "cryptozool-
ogy", a pseudo-science created by Bernard Heuvelmans on the basis of a misunderstanding, because he

thought that onomatophores were required by the Code for description of new zoological taxa (Pauwels &
Chérot 1997): in fact, they were not then, but the problems created by such descriptions led many zoologists
to hope that the fourth edition of the Code would require the designation of an onomatophore and its deposi-
tion in a collection for nomen availability. In the absence of such a Rule, it is formally impossible to exclude
from zoological nomenclature some extreme cases of "hypothetical concepts" described as new taxa. Thus,
the description by Quintart (1989), as Marsupilami franquini, of the marsupilami, an imaginary animal cre-
ated in cartoons by Franquin, was recorded in the Zoological Record, and there is no reason why the Rhino-
gradentia, imaginary organisms described with extravagant details by an imaginary professor (Stümpke
1962), should not be so!

(4) Alive specimens as onomatophores

In the recent years, some new species were described with live holotypes, maintained in captivity in zoos
or vivaria. Although zoological gardens can be considered as a special kind of "collections", keeping live
instead of dead animals, their status is quite distinct from collections of museums, for several reasons. First, as
long as it is alive, a specimen may escape and disappear forever. It may also die, and its death may not be
noticed immediately by the responsibles of its keeping: it may then be eaten, entirely or partly, by other cap-
tive animals, including "preys" provided for its feeding (crickets will rapidly eat a frog specimen after its
death in a vivarium), it may desiccate or putrefy, etc. Even if found rapidly, in many cases, such a holotype
will often not be as well fixed as a specimen killed and fixed carefully for proper subsequent study. Thus, even
if the "intention" to fix and keep the specimen in a museum collection after its death is announced, for exam-
ple in giving it already a collection number even before its death (e.g., the holotype of Varanus melinus, see
Böhme & Ziegler 1997), this intention may not be fulfilled later on.

What can be the reasons for keeping a holotype alive instead of killing it before description of the new
taxon? One of them may be to obtain its reproduction in captivity, which may be all the more desirable as the
species is rare and endangered. This can be a good reason only in some cases: specimens of both sexes must
be available (in taxa with separate sexes), and breeding must be feasible in captivity. These conditions are not
always met, far from that. Other reasons may be to do ethological observations on this specimen in captivity,
or simply to show the animal to the public (which is usually the case in zoos). No need to say, in many cases
(e.g., in mammals and birds), behaviour in captivity is widely different from behaviour in the field, and the
information that will be so obtained will be of little help to know the species better. The question should there-

fore be asked in all such cases: is the potential benefit that can be derived from keeping the specimen alive
worthy of talking the risk to see this specimen escape, or be eaten or injuried by others, or desiccated or rotten,
instead of having a well-fixed holotype in a nice position allowing good morphological studies? In many cases, the answer to this question will be "no". But then we come to another problem, the real "mawkishness"
of many zoologists nowadays, which results in a number of them been simply reluctant to kill animals, for so-
called reasons of "ethics". This problem is explored further below.
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The conservation issue
Let us come back here to the conservation issue, in a different perspective from that presented above. If a
species is found so critically threatened by extinction that the collection of a single individual would be a risk,
then it is quite possible, not to say very likely, that this species will not survive long in nature due to obvious
reasons of population dynamics and genetics. In this situation, what is ethical? To allow the species become
extinct without documenting the loss? On the contrary, isn't it then an ethical responsibility of zoologists to
keep at least one specimen in a museum to document the existence of a species which became extinct during
modern times, in most cases as a result of human action? From a scientific point of view, this course, docu-
menting the biological information on diversity, is certainly preferable to that consisting in leaving this spe-
cies become extinct without keeping a single material testimony of its existence for future generations of
biologists. Then, if a species is threatened by extinction, it is an additional argument to keep a specimen in a
museum, not to the contrary.
It is quite likely that "extreme conservationists", and even perhaps most "conservationists", will not agree
with the statement above. They will probably say that, as long as a species has "a chance" to survive, it should
be left this chance. Some of them would certainly even push this argument further, and suggest that, even
when only one specimen of an undescribed species remains alive, and has no possibility to leave an offspring,
it should be left alone, free and untouched whereas a responsible taxonomist would certainly think that this
specimen should be either immediately killed and fixed, or kept carefully in captivity for preservation at its
death. We are in fact here in front of genuinely different approaches to species extinctions on our planet. Many
conservationists think that conservation should be the first priority in all cases, even when the chances of

recovery of the species are very weak or null, and even when this attitude threatens the possible obtention of basic biological information on this species. In contrast, many taxonomists will think that preserving at least one specimen in order to preserve information for science, should be the priority in such situations. Both points of view have supporting arguments, and there is not "one truth" in this respect. What will be decisive in the end is the relative social influence of the supporters of each approach. In this respect, it is clear that nowadays conservationists have built up strong social lobbies to support their ideas, which is not the case of zootaxonomists who have shown until now very little aptitude for social communication and power (Dubois 2003) and who have not even proved able to create an international scientific society, not to mention a lobby (Dubois 2006c). But this does not demonstrate in the least that the former are "right" and the second "wrong" - only that the former are socially more efficient (which is widely different, and illustrated by many recent decisions of "policy makers" in science, a matter which is far beyond the scope of the present paper). At any rate, taxonomists should feel free to consider both options, and to do what they think is best, not what members of another community think is best in order to please so-called "social demand", which is in fact merely the demand of one social group, not of society as a whole.

As a matter of fact, the question may be asked whether the "message" that conservationists (at least those who fight against the collection of specimens to document the diversity of life on this planet) want to pass to "society" is the good one. This message is as follows: yes indeed, for centuries, and especially in the last decades, human societies have made "choices" (sometimes without realizing that they were doing so) that had major negative impacts on the ecological equilibria of the planet we live on, and in particular they have been (and still will be) responsible for innumerable species extinctions; however, some of their members at least have now become conscious of this problem, and have decided to do everything possible to stop this process. These persons think that the major priority of the next decade should be to "stop the erosion of biodiversity".

Until this point, this message is likely to be agreed upon by most biodiversity-oriented biologists, including conservationists and taxonomists. But consensus is absent when it comes to two further statements: (1) collection of specimens by taxonomists and for museums is a major factor of species extinctions; (2) we have the power to "repair" the destructions that our civilization has done. Let us consider these two statements.

As oultined by Patterson (2002), not a single case is known where scientific collecting has imperiled or

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caused the extinction of any Neotropical mammal, and we do not know of a single case in any other zoologi-
cal group. In a few cases of species with commercial value, either as brightly colored, spectacular pets (espe-
cially in vertebrates), or as "rare" and very appreciated collection items (especially in insects and molluscs),
massive collection may have contributed to deplete or even wipe out some populations or species, but this has
nothing to do with taxonomic research and museum collections. Even when taxonomists collect what they
consider to be "large series" of specimens (quite useful for the appreciation of intra- and interpopulational
variation, and therefore for the characterisation of specific and subspecific taxa), such series are ridiculously
small compared with the captures made for human consumption, by pet trade or by insect or mollusc collec-
tors. It is hypocrit, misleading and ill-directed to confound both activities.
Taxonomists, who are an infime minority with a very little power, cannot be the scapegoat for all the mis-
takes and crimes made by our societies in the last century. It may be appealing to throw back all responsibili-
ties on this small and weak community, but it does not solve anything. Furthermore, even if this is not
appreciated by many, practising field taxonomists are in fact among the persons who have the best knowledge
of real biodiversity in the wild, and their daily experience is that extinctions are going on at a very rapid pace,
in many habitats but mostly in tropical areas, as a result of factors such as deforestation, destruction of humid
zones, pollutions of all kinds, climate changes, faunistic and genetic pollution (Dubois 2006c), etc. Most of
these destructions are of such a magnitude, and show no significant trend of change (despite repeated declara-
tions and statements), that it is completely misleading to pretend that these phenomena will stop in the next
decades, not to say that our civilization will "repair" the results of its mistakes.
Many of these debates, however, are carried out as if we were in an "ideal" world where it would be
enough to say something to see it happen. In the just recent years, many members of our societies (who were
still, several decades ago, treating those of us who were announcing massive extinctions, of birds of ill omen
or simply of liers) have progressively become conscious that our civilization is indeed destroying a large pro-
portion of the species biodiversity of our planet. This is a nice step, but as long as it is not followed by major
changes in major options of our world, regarding industry, economics, profit and decision-making, this con-
sciousness-raising will have little material impact. Words won't replace action in this respect, and as long as
our societies do not make these major changes, extinctions will go on. Saying and writing the contrary is lying
to the public. And it is a lie to say that we will "repair" the damages we have done.

Promoting the idea that collecting one specimen for the taxonomic and nomenclatural purpose to have an
onomatophore, i.e., a testimony of the existence of a species for present and future researchers, is a major fac-
tor of species extinction, is an hypocrisy and a lie. It does not help "conservation biology" to reach any of its
but it may appear easier and less costly to pretend so than to struggle against industrial lobbies or
shareholders of companies responsible of the current disaster. Taxonomists should resist this pressure, and
organize themselves for this resistance.
aims-
Today, "conservation" appears to many as a more laudable aim than "knowledge". However, one of the
major aims of science, besides helping man to act efficiently in mastering the causes and effects, is "simply"
to "understand" the world we live in. One of the major aims of comparative (i.e., non-reductionist) biology is
to understand how evolution has proceeded, and to reply these "how" and "why" questions it is first necessary
to reply "what" questions (Mayr 1997). With less, or possibly much less, than 10% of the living species of
our planet yet collected, described and named, we cannot say that we are close to answering the "what" ques-
tions of biodiversity (Dubois submitted-a) - which means that we are still far from being able to answer the
"how" and "why" questions. Isn't it legitimate to think that answering these questions should remain a major
goal of science and culture?
The gigantic recent progresses in molecular study of organisms, especially through the use of nucleic acid
sequencing for molecular phylogeny, have tended to obscure the nature of biodiversity for many zoologists,
some of whom have no or almost no "culture" in morphology, anatomy, behaviour, etc. As interesting as
knowing the DNA sequences of an organism may be, these won't tell us everything about the organism. Until
the phenotype, behaviour, ecology, of a species have been studied, we know almost nothing about this species,
even if we have an hypothesis on its phylogenetic position and if we are able to "recognize" it by its DNA
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Fortunately, in front of those who think that everything about organisms can be known from their
and photographs, the irreplaceable rôle of vouchers and specimen collections in systematics, and more
malogy (Patterson 2002).
generally in all works on biodiversity, has been outlined repeatedly by workers in botany (Funk et al. 2005),
herpetology (Stuebing 1998), ornithology (Goodman & Lanyon 1994, Remsen 1995, Winker 1996) and mam-
The contribution of a specimen to our knowledge about biodiversity is roughly inversely proportional to

its rarity. Several steps can be distinguished in our knowledge of a species through specimens. The first one is
passing from no specimen to one specimen. The second one is passing from one to several from the same pop-
ulation, especially to a second one of the opposite sex. A third step can be recognized when small series of
specimens, e.g., of 8-20 specimens of each sex from a population, are available, as these allow simple statisti-
cal tests for comparisons of samples (Dubois 1984), and a fourth step is attained when samples from several
populations referred to the same species have been collected. Among these steps, the one which is by far the
main one, for our knowledge, is the first one. The number of characters that can be studied on a specimen is
virtually endless (Dubois & Ohler 1997a), and a single holotype allows innumerable observations, especially
DNA or photographs are available, precludes a number of studies.
when non-intrusive techniques such as radiograph or scanner are used. But lacking a holotype, even when
Recent trends for opposition to collecting specimens are, at least, in the eyes of taxonomists and evolu-
tionary biologists, based on a ill-understood approach to "ethics", chosing ignorance in the name of "conser-
vation", although it is clear that efficient conservation cannot be based on ignorance. This was a rarity a few
years ago, when a student in a field research party could decide to release at night a specimen of a new species
of salamander kept alive in a plastic bag (David Wake, personal communication to AD, about the specimen of
the new species Bolitoglossa jacksoni shown in fig. 6 of the paper by Elias 1984). Nowadays, when finding a
unique specimen of a lizard species considered extinct and rediscovered after 130 years, even a professional
zoologist may decide to photograph and release it (Ineich 2006): what could have been in a rather recent past
considered a professional misconduct is now more or less imposed by the "ethically correct" tyranny. This is
part of a more general trend in which some students may now embark on higher studies in biology but refuse
to kill specimens or to experiment on them. If this trend goes on, zoologists may be forbidden to collect spec-
imens even in order to photograph them or take a feather or a drop of blood from them, in order not to "dis-
turb" them. This would indeed remind the obscurantist medieval times when anatomists and physicians would
be forced to dungeon or to stake for having dissected human bodies.
Winker (1996) identified five causes for the opposition to collecting specimens for biodiversity studies:
(1) focusing conservation at the level of the individual; (2) unfamiliarity with population biology; (3) misun-
derstanding of scientific research; (4) typological thinking, and (5) misplaced morality. Except for (4), all
these factors are active in the opposition to collection and fixation of even a single specimen as holotype for a
new species, and should be countered by taxonomists.
When Vieilliard (1976) described the new Kabyle bird species Sitta ledanti, he collected, killed and fixed

one adult male for holotype and one adult female for paratype, although he was then aware of the existence of
only a dozen of couples. No doubt if an ornithologist was doing this today, he would face difficult time with
"conservation biologists". Nowadays, although still threatened, this species is still alive and other populations
have been discovered (Bellatreche 1991, Doumandji & Kisserli 1993). However, the important point regard-
the
ing present discussion is that, if unfortunately this species had become extinct, the existence of one speci-
men of each sex in a museum collection was liable to provide major information on its morphology and anatomy which descriptions and illustrations alone could not provide. Taxonomists should care for obtaining
such basic, "minimum" material, for all new species they discover and will discover in the coming years and
decades.
The media and laymen are very excited everytime a new fossil species of dinosaur or humanoid, or a large
species of living mammal or bird, is discovered, but interest is much weaker for less "extraordinary" discover-
ies, especially of organisms smaller, more discrete, or less close to our own species. Zoologists and especially
taxonomists are not bound to share this approach, and may feel that any obscure mite or sea snail is as impor-

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to knowledge as a dinosaur. One way of making sure that discoveries of new species are transmitted to our descendants is not only to describe them but to keep voucher specimens in museums and other permanent
collections. Nomenclatural Rules, in obliging serious taxonomists to keep at least one specimen of each
described species, are a strong support for such an activity. The progress made in Article 16 of the last version
of the Code should be made more irreversible by making this article more stringent. The need of depositing an
onomatophore in a permanent public collection should be recognized for standard publications of species.
suggestions and recommendations in this respect for the future.
However, some of the problems mentioned above should also be addressed. We therefore provide below some
Proposals regarding the Rules of nomenclatural availability of nomina
Biology needs a universal and unambiguous language for the designation of taxa, and this language is pro-
vided by the codes of nomenclature. For a smooth and efficient functioning of these codes, some principles
must be respected (Dubois 2005: 375-378). An important principle is simplicity, especially the fact that Rules
are unique and general and contain as few exceptions and special situations as possible. In zoology, the current

Code contains already too many exceptions and particular cases (especially Rules that are valid only until a certain date, or after a certain date), and if it was to be changed in this respect, this should be in the sense of simplification and uniformisation, i.e., of suppression of exceptions and particular cases. It would therefore not be appropriate to consider the introduction of special Rules for the availability of nomina, e.g., for "very endangered species", for "very rare species", for "species difficult to collect" or for "extinct species known only from iconographic documents". The same Rules should apply to all animal taxa, whether large or endangered, rare or common, living or extinct. However, there should be room within these Rules to deal appropriately with all specific cases and situations.

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In our opinion, Article 16 should be made more stringent regarding the need of onomatophore deposition.

We think the major strength of the Code, and its superiority over alternative nomenclatural systems that have been proposed, lies in its being based on onomatophores for allocation of nomina to taxa: this establishes connexion between the world of organisms and that of language, and allows this allocation to be objective, not based on interpretations of definitions. We think the need of material onomatophores (i.e., specimens, not photographs, sound recordings or molecular sequences) for the availability (and hence validity) of zoological nomina should now become even more stringent than in the past. This would insure not only to maintain this objective reference for ascertaining the status of nomina, but also to make sure that at least one specimen of every new species described in this century will be the matter of a legacy to our descendants. This does not mean however that collection of specimens should be made blindly and without care for problems of species conservation. Regarding the latter problems, we think two different approaches should be combined: (1) the careful choice of specimens collected and fixed; (2) in some cases, the recourse to alternative approaches, i.c., delaying naming or naming through a specific action of the Commission.

The first way to conciliate the concerns for conservation issues with a Code requiring that at least one specimen should be held and conserved in trust for science, is through the choice of this specimen. In most cases, especially involving vertebrates, a male (preferably an older one, which has greater probability of having reproduced and of not being able to do it again) should be preferably kept instead of a female, due to the potential lower impact on the effective number of the population. In some other cases, when the sex ratio is particularly skewed, the specimen should be taken among the most abundant sex, and if several widely different phenotypes are observed, the most common one should be chosen.

Now, we have seen above that, in some cases, it is indeed useful to have the possibility to describe a new
species without having a specimen in hand. It might indeed be the case in some exceptional cases (although
not as a routine procedure) for species threatened with extinction but which might still survive if we do not fix

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men (e.g., a species for which only one couple would still be alive). It might be the case for some which are indeed (at least for the time being) impossible to collect or to conserve. Above all, it has and will certainly again be the case for species that are now (or are now believed to be) extinct, but for which illustrations or descriptions are available and informative enough to allow the proper description and
naming of a new taxon.

In such cases, two different situations must be distinguished. In the first one, the possibility exists to obtain later a specimen that could be deposited in a collection as onomatophore. This may be after more pre-
cise estimates of the number of alive specimens of the species have been obtained, ascertaining that they are
more numerous than initially thought, and allowing to collect one of them. This may be after recovery of an
initially very low population, with increase in its size. This may be after discovery of other populations of the
same species. This may be after permanent close watch of the relict population, allowing to collect one speci-
men after its natural death. This may be after techniques have been developed allowing to capture a specimen
although this had long been considered impossible (as in the case of Torquerator bullocki mentioned above).

In all these cases, it is certainly much better to wait for formally describing the new species until a specimen
has been collected and studied. This would avoid basic factual mistakes based on wrong interpretations of
photographs as in the example of Torquerator bullocki. This course is the one that had been suggested by
Timm et al. (2005) in the case of the monkey Lophocebus kipunji: "Jones and colleagues are encouraged to
acquire a specimen, or part(s) thereof, and prepare a new description of this, as yet, undescribed species".

This course raises only one problem, but a genuine one: the risk that (an)other author(s) than the discov-
erer(s) of the species take advantage of this absence of formal description to collect a specimen, describe and
name it to become "author(s)" of the new nomen. Although this is not much mentioned in textbooks, the his-
tory of zootaxonomy is full of similar examples, which indeed are a major plague of the discipline, as is well
known by all researchers in this field. Interestingly, in the many discussions that have been devoted in the

recent years to proposals of changes or improvements that should be brought to the current nomenclatural
Rules, few discussed this problem. As was very aptly pointed out by Ng (1994), the function of adding the
name of the author after the nomen of a taxon is not to please the author, "to promote the reputation of a scien-
tist or simply an egotistical exercise", but is to help "to keep track of authors, publication dates and to trace the
original references", through databases like the Zoological Record. Dubois (2000) discussed this matter and
suggested that mentioning only the publication year of the nomen, without the author(s)' names, would play
the same function and would help limiting artificial inflation of unwarranted nomina provoked mostly by
"mihilism", as Bruun (1950) ironically termed it. However, such a change would clearly threaten the
so many taxonomists that, although it may be highly desirable (Dubois submitted-b), it may not be easy to
implement, as highlighted by the fact that promoters of the Phylocode project, who could well have decided
not to add authors' names after their nomina, did not apparently consider doing so (Dubois 2005).
egos of
A second situation is that of species described on the basis of documents attesting the past existence of a
taxon that is now extinct and for which it is unlikely that fossil or subfossil material will be discovered. Such
unlikely events sometimes occur, as shown above by the case of the Mascarene turtle. A recent example is
quite enlightening: Oliveira & Langguth (2006) elegantly showed that the new monkey species described as
Cebus queirozi by Mendes Pontes et al. (2006) had already been described more than two centuries ago as
Simia flavia Schreber, 1774. However, such rediscoveries are exceptions and in most cases the species will
remain known only from the ancient documents and no specimen will ever be found. In such cases, it would
not be clever to impede their formal description and naming because of rigid nomenclatural Rules. So a spe-
cial solution must be found for such cases.
As mentioned above, there should be a single Code, not different Rules for different situations. We think
the Code already contains a provision that would allow the description of new taxa, in some very exceptional
cases, without material onomatophores. Article 10.1 of the current Code reads as follows:
"10.1. General conditions to be met. A name or nomenclatural act is available, and takes authorship and

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when it has satisfied the provisions of this Article and, when relevant, of Articles 11 to 20 (...). A
be ruled to be available by the Commission (...) if these conditions are not fully met."
We think advantage should be taken of the last sentence of this article to solve the nomenclatural problem

here addressed. In the exceptional cases where good reasons (as discussed above) would make it impossible to validly name a new taxon under the usual Rules of the Code, this could be done through submitting a special request to the Commission. This could take the form of submission of a manuscript for publication in the Bulletin of Zoological Nomenclature, the official journal of the Commission, followed by a vote of the latter to validate the new nomen (just like in the cases of normal applications submitted to the Commission for decision). This would be a heavy procedure, but one which would respect the current Rules of the Code. It should remain heavy in order to discourage "lazy" zootaxonomists to call upon it, as it should be used exceptionally, and not become a routine procedure. If nothing is done in this direction, it is not unlikely that in the coming decades all new species of primates, why not of mammals, why not of vertebrates, will be described on the basis of photographs or of DNA sequences taken from a hair, a feather or a drop of blood, without even a brief description of the organism, and without material onomatophores. For the reasons explained above, such a move would be very harmful to taxonomy in the future.

Conclusion

Voucher specimens play a crucial, although often misunderstood, role in modern taxonomic and evolutionary research. Among them, onomatophores ("name-bearing types") play a special function, being the objective references for the allocation of nomina to taxa. The Rules of the Code, which have been improved in the last edition in making compulsory the designation of a material onomatophore (one specimen or several specimens) for the availability of a new nomen, should also make compulsory the deposition of onomatophores in public collections. In the few exceptional cases where collection or conservation of a specimen is impossible (for difficulties of collecting or of keeping, for conservation reasons, or when the taxon is known only from ancient documents), choice should be made between two possible courses: (1) either preliminary description of the taxon through indirect evidence (photographs, DNA sequence, etc.), but without naming it, pending the acquisition of an onomatophore and its deposition in a public collection, whenever this subsequent acquisition is likely; (2) or formal description of the taxon and proposal of a new Latin nomen based only on photographs, drawings, DNA sequence or other indirect evidence, but then in a paper submitted for publication in the Bulletin of Zoological Nomenclature, followed by a vote of the Commission to validate nomenclatural availability of this new nomen under the provision of the last sentence of Article 10.1.

For implementation of these changes in the Code, we propose the following new wording for Article 16.4

(no changes are proposed in the four recommendations of this article):
"16.4 Species-group names: explicit fixation and deposition in public collections of name-bearing types. Every new specific and subspecific name published after 1999, except a new replacement name (a
nomen novum), for which the name-bearing type of the nominal taxon it denotes is fixed automatically (...),
must be accompanied in the original publication
16.4.1. by the explicit fixation of a holotype, or syntypes, for the nominal taxon (...), and,
16.4.2 by its deposition in a collection or several, with a statement indicating the name and location of this
(or these) collection(s), or a statement that it or they will later be deposited there (see Recommendation 16C).
16 4.3. In the exceptional case where the holotype or syntypes cannot be collected and/or conserved (because the taxon is believed to be extinct, of difficulties or impossibilities of specimen collection or conser-
vation, or because the taxon is threatened with extinction), formal description and naming of the taxon should
be postponed until one or several specimens can be collected; if it is unlikely that any specimen will ever be
available for deposition in a collection, the taxon should be described and named on the basis of indirect evi-

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ancient document showing an illustration or presenting a description of the taxon, photograph, ar data) in a paper submitted for publication in the Bulletin of Zoological Nomenclature, and formal ility of this name should be voted upon by the Commission as allowed by Article 10.1."
To complete this change in Article 16, the following new wording should be implemented in Article 73.1.4:
-73.1.4. Designation before 2000 of an illustration of a single specimen as a holotype is to be treated as designation of the specimen illustrated; the fact that the specimen no longer exists or cannot be traced does not
of itself invalidate the designation. (...)
We believe these proposed changes in the Code would allow to solve the problem raised in recent papers,
regarding the description and naming of new species without contributing to their extinction, but without opening the door for a routine description of new species without onomatophores, which would be very detri-
mental to taxonomy and to our knowledge of biodiversity
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From the hobbit team, more human relations

Stephen Cauchi
May 6, 2007

MORE bizarre, extinct human species - dwarfs and even giants could be uncovered in Indonesia's southern islands, with the Australian discoverer of the "hobbit" set to begin fresh diggings next month.

Mike Morwood who with fellow Australian Peter Brown led the team that discovered the hobbit, Homo floresiensis, in 2003 is predicting further species will be uncovered on the islands of Timor and Sulawesi, which are near Flores.

Professor Morwood, with a team headed by Indonesian archaeological professor Fachroel Aziz from Indonesia's Geological Survey Institute, will soon start excavations in the Atambua Basin of Timor. Afterwards, the team will begin diggings in Sulawesi and will return to the Ling Bua cave in Flores, where the hobbit species was uncovered.

"We predict a number of these islands are probably going to have their own endemic human species, and many of them will be small," Professor

Morwood, from the University of Wollongong, said.
Hobbit: small of stature but a huge scientific
find.
Photo: Robert Pearce
and early humans,
He said the evolutionary challenges of living on small islands meant animals
or hominids tended to shrink or grow, dramatically, over a number of generations.
Island gigantism a form of natural selection in which bigger size provides a survival advantage
- can be seen in the Komodo dragon and the giant tortoise of the Seychelles, as well as extinct species such as the moa and dodo.
Although the trend on islands is for large animals such as humans to shrink and small animals such as rodents to grow, there are glaring exceptions. There are islands with gigantic and dwarf forms of the same type of animal.
"If the island is large enough, and Sulawesi is, (you could have a situation where) a hominid gets there and some become small and some become bigger," Professor Morwood said. "Sulawesi could be a place where you have a whole range of hominid species."
The discovery of the hobbit rocked the scientific world, and it has earned the title of one of the

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most significant anthropological discoveries of the past century.
Its tiny stature, and recent passing, stunned anthropologists. It died out only 13,000 years ago, making it the most-recent living human relative.
The only other human species known to have coexisted with modern humans (Homo sapiens) were Neanderthal man and Homo erectus. Neanderthal man lived in Europe, becoming extinct 30,000 years ago. Homo erectus lived in Asia and became extinct possibly 100,000 years ago. Despite having a small brain, the hobbit species could cook, hunt large prey and build rafts. Stone artefacts and animal remains were found with their skeletons.
Controversy arose when some Australian and Indonesian scientists claimed the hobbits were not a separate species, but only pygmy versions of Homo sapiens whose small brains could be explained by disease. This view remains discredited by mainstream anthropologists.
Professor Morwood flagged that any new human species found on Timor and Sulawesi would be called Homo timoriensis and Homo celebesiensis (Celebes being the former name of Sulawesi).
He said these new species would have evolved separately on their respective islands for more than a million years. Although they could be similar is size, they would be different enough to warrant their own species name.
Professor Morwood said further archaeological finds would help answer the puzzling question of the ancestry of the hobbit, which could lead to a total redrawing of the human family tree. A popular explanation is that the hobbit and any species that lived in Timor and Sulawesi
are descended
from Homo erectus, which lived in Indonesia, notably Java, for thousands of years. But this was probably wrong, Professor Morwood said.
"Some of the traits of Homo floresiensis are so primitive - they're more primitive than you find in Homo erectus. It seems likely that the ancestor was something before Homo erectus," he said.
If true, this would revolutionise our understanding of human history because Homo erectus was believed to be the first early human that was advanced enough to leave Africa.
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cut of the fish, and underneath the following following broadside, which is copied literatim from lines):-
the original in my possession: -
"The Workes of God how great and strange they be,
A Picture plaine behold heare may you see."
Two years later, Timothy Granger penned, and Thomas Colwell printed, a prose description of "A moste true and marvelous atrannge wonder the lyke hath seldom been seene of xvii Monstrous fishes taken in Suffolke at Downam Brydge, within a myle of Ipswiche, the xi daye of October in the yeare of our Lorde God 1568."
Stow, in his Annales, has left us a particular description of this "wondrous draught of fishes;" some of them being "eight and twentie foote in length, at the least."
The following year "C. R.," probably Clement Stories in Metre, favoured the world with Robinson, the author of Pleasant Sonnets and "The true description of this marvellous strange Fishe, which was taken on thursday was sennight, the 16 day of June, this present month, in the year of our Lord God 1569."
This production also came from the fertile press of Thomas Colwell, "beneath the Conduit, at the signe of Saint John Evangelist," in Fleet-street. A copy is preserved in the rare collection of George Daniel of Islington. Like its predecessor, the "strange fish."
it is ornamented with the "effigies," in wood, of Wolfe, in 1586, printed a broadside containing an account of a monster fish found in the heart of a horse! And on the Registers of the Stationers' Company for 1595, is entered an account of "A strange and hughe fishe dryven on the Sandes at Outborne in Holdernes, in Februarye." The interesting books of the same Company also contain an entry, in 1604, of "A strange reporte of a monstrous fish that appeared in the form of a woman from her waist upward, seene in the sea."
In Sir Henry Herbert's Office Book, which contains a register of all the shows of London from 1623 to 1642, occurs "A licence to Francis Sherret to show a straunge fish for a yeare, from the 10th of March, 1635.'
In the Gough Collection, preserved in the Bodleian library, is a curious prose tract of eight quarto pages, "printed for Nath. Butter, 1642," with the following quaint title:-

"A Relation of a terrible Monster, taken by a Fisher-
man near Wollage, July 15, 1642, and is now to be seen
in King Street, Westminster, the shape whereof is like
a Toad, and may be called a Toad-Fish; but that which
makes it a Monster is, that it hath hands with fingers
like a man, and is chested like a man, being neero five
foot long, and three feet over the thickness of an ordinary
man. Whereunto is added, a relation of a bloudy en--
counter betwixt the Lord Faulconbridge and Sir John
Hotham, wherein the Dake of Richmond is hurt and the
Lord Faulconbridge taken prisoner."

These notices of "strange fish" might readily
be multiplied, but they will serve to introduce the
"A most Strange but True
ACCOUNT
of a very
LARGE SEA-MONSTER,
"That was found last Saturday in a Common-Shore in
New Fleet-Street in Spittle-Fields, where at the Black-
Swan Alehouse, thousands of People resort to see it:
Herein you have the Dimensions of the said Surprizing
Creature, with the various Conjectures of several able-
Men concerning what may be the Omen of this Creature's
leaving the Sea, and to rove so far under Ground, the
Common-Shore where it was found running above two
Miles before it empties itself at Blackwall: The occasion
of this Creature's coming hither being likewise hinted on
by P- -ge in his Monthly Prognostications for this
year 1704.
"Presaging the several mutations which are approach-
ing to Kingdoms, States, and Commonwealths, something
appears wond'rous in the Heavens, Earth, or Watry Ele-
ment, by frightful Blazing Comets, Monstrous Births, or
strange Fishes leaving their deep Habitations of the Sea
to swim in Brooks and Rivers: and as to strange Omens
foretelling Alterations in this Kingdom, our Chronicles
give an Account that when King Ethelred ascended the
Throne by his Mother's murdering his Brother Edward,
upon his Coronation-Day, a Cloud was seen throughout
England, half resembling Blood, and half Fire; which
Prodigy was the forerunner of the Danes landing here
tbree years after, and committing great outrages in divers
parts of the Kingdom. Before William Rufus was kill'd
by Sir Walter Tyrrel in New Forrest, two blazing Stars
appeared; and at Finchhamstead, near Abington in Berk-
shire, a Well of Bloody colour'd water sprung up for
fifteen days, and then ceased. Before Henry the Second
dyed it rained Blood in the Isle of Wight, for the space of
two hours; a Dragon of marvellous bigness was dis-
covered at St. Osyph in Essee; an Earthquake rented in
pieces the Cathedral at Lincoln; and in Orford in Sussex,
certain Fisher-men drew up in their Net a Hairy Crea-
ture out of the Sea, in all Proportions like a Man, which

was exposed to the Sight of Thousands, living upon Flesh, but in the end stole from his Keepers and got to Sea again. In the Reign of Henry the Third, four Suns appeared from the rising to the setting, after which followed a great Famine. Before Richard's resignation of his Crown, to Henry the Fourth, the Bay and Lawrel Trees withered throughout England. In the time of Henry the Sixth, whilst a great Fight was at Ludlow betwixt the two Houses of York and Lancaster, threa Suns appeared in the Firmament, which immediately united into one, and the next Reign began the Union of the Families. And so when Oliver Cromwell's Usurpation was at end, the Members of the Calves head Club confederate the Devil fetcht him away in a terrible Whirlwind. But now as strange a Wonder ensues, which take' as follows.

"On Saturday last, being the 20th of this instant May, something of a strange unusual Shape was perceived to be in a Common Shore in New-Fleet-street in Spittle-Fields, which excited their Curiosity who saw it, to make' a further search into the Matter, and accordingly going into the Common-shore (which runs above two miles under Ground before it empties it self at Blackwall), they dragged the Creature out, which was a dead Porpoise of a very large Size, it being above Four Foot in Length, and Three Foot about, which now is to be seen at the Sign of the Black-Swan, an Alehouse, in New-Fleet-Street in Spittle-Fields, as aforesaid, to which thousands of People daily resort to view it: Now as to the Nature of this

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Fish, which is vulgarly called a Sea-Hog, from its being like a Swine both in Shape and Flesh, its Residence is in the Sea, and appear in multitudes against an approaching Storm, tumbling after a strange manner with their Bellies upwards, about Ships that are on their several Voyages; and that it should leave the Deep to rove up into Fresh Water Rivers, and more especially to crawl so far up a Common-Shore, it seems somewhat amazing among the Curious; there is now great turning over of Partridge whose Prognostications are much admired by the Mob, but they find he has took no more Notice in this year's Almanack of this Porpoises untimely Death in a Common-Shore, than of the Thunder which we had last Week, he taking no notice that we shall have any at all this Year; but to make amends for this Fault, I believe it wou'd be very acceptible to the Fools under Crispin's Meridian, if in his next year's Almanack he would oblige them with the Hyleg of this poor Fish; but the general conjecture of this Creature's rambling so far up a sh■n

Concavity under Ground, is, that it either came from the French Coasts, and signifies Lewis is ready to beshit himself, for fear the Affair will not go as they shou'd do in Spain; or else it came from the Spanish Coasts, and intimates, by his Obscurity, that the Duke of Anjou had rather hide his head than fight; and the last Conjecture I believe to be most probable, because Partridge says in his Prognostications in this Month, The Gingerbread King of Spain full of Fears and Fatigue, it belongs to the Family. Moreover it is thought this Strange Fish came of some good Family, because the Possessors of it talk of having R-1 in F-street embalm it against they show it at Green-Goose-Fair.

"Licensed according to Order.

"London, Printed for R. Smith near Spittle-Fields-Market, 1704."

EDWARD F. RIMBAULT.

FLY-LEAF SCRIBBLINGS, ETC.

1. From the man who rescued the Queen Mary's psalter from destruction, on presenting it to the queen :-

"God save the most vertuous and Nobull quene Mary's gras,
And sende her to injoye the crowne of Eynglande longe tyme and space,
Her enemies to confounde and utterly to deface,
And to follo her godly procedynges, God give us gras;
As every subyegte us bounde for her gras to praye
That God may preserve her body from all dangers both night and daye,
God save the Quene.
Be me, your humbul and poore creytur, Rafe Pryne, Grocer of London, wishes
your Gras
helthe.'
prosperus
1-

2. From an early book in Sion College: -

"Item si mulier jejuna bibat per triduum duos ciathos aquæ in quâ erramentum extinguitur, fit in perpetuum sterilis."

What is erramentum ?

3. Line (in book of Homilies by a vicar of Magd. Oxon. fifteenth century) which reads the same both ways:-

"Anna tenet mappam madidam, mappam tenet Anna."

4. In a MS., end of the seventeenth century: -

"Testamentum J. M. Ari (propria manu scribentis),

A.D. 1736, elatis 77; cui singulari fere forte evenit, ut de paterna gente sedulo inquirenti, non occurrebat quispiam oriundus. In fide, spe et charitate humillima omnipotenti Creatori animam dedo.

"Acceptationem penitentiæ meæ et remissionem peccatorum supplicissime implorans, et ad extremum vitæ terminum imploraturus per Jesum Xtum Salvatorem nostrum.
"Pater de Coelis, Deus Fili Redemptor Mundi, Deus Spiritus Sanctus, Deus Sancta Trinitas, Unus Deus, "MISERERE MEI."
I should much like to know who was the writer
5. Sixteenth century: -
"There is no charge in the Churche so daungerous bat yt a good conscience can avoyde it; but a weak or corrupt conscience may sone be cast awaye: like as the wild rose from whence the bee fetcheth her hony, and likewise the spider her poyson. The Prince may do his devoir doing justece, and not doing tyranny. The man of armes, going to the warre and not hurting the poore people. The maried man may live well in his house w'ont advoutery. The riche man geveth his goods for God's sako wtout usury. The laborer in workyng. The shepehard in kyping of his shepe wtout hertyng of his neighbors, and in like case of others.
"Now to prove this is true from the Scripture, David was good and Saule evill: Of pristes, Mathias good, and Obnias (Hophni?) Daught: Of prophetes, Danyel good, Balam evill: Of shepeherdes, Abell good, Abimilech evil; Of widowes, Judithe good, Jezabell evill: Of riche, Job good, Naball naught; Of the apostles, St. Peter good, Judas was reproved.
"Respice finis (sic).
"And yu shalt nevr do amiss.
"Posui finem curis, spes ac fortuna valete."
J. C. J.
A Friend to the House of Hanover. On a fly-leaf of a work entitled "Mathematical Tables, &c., by J. Brown, Mathematician," published the fatter end of last century, and which I picked up at a recent sale of old books in this place, I found the following quaint verses inscribed, in which strong proof is afforded of the writer having been any but an adherent of the hapless House of Stuart.
Arbroath.
"I love with all my heart
The Hanoverian part,
And for their settlement,
My conscience gives consent.
Most glorious is the cause
To fight for George's Laws.
This is my mind and heart,
Tho' none should take my part,
The tory party here
Most hatefull doth appear.
I ever have denied

To be on James's side:
To be with such a king
Will Britain's ruin bring:
In this opinion I
Resolve to live and die.'
K.
Inscription in a Bible.-On a fly-leaf of an an-

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THE WASHINGTON TIMES, SUNDAY MARCH 27 19
WONDERFUL STUNTS OF GEORGETOWN'S DRAGON
WIST WAS ONGTON MICH
BOND OVER A CREE
MEATURE
Mas its caver
Not
Soy H
Ava
WHICH WOULD YOU PREFER TO MEET IN THE DARK?
NG SORTING HARES
CALL
FIB
IVERY JONGME
Sobies Ford N 1
Der Five St
Up ke
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IS FURNISHED BY THE DRAGON
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THE REVOLT OF FAIRFAX
THE TRAMPS LOVE STORY

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yu me
Dinled
elons? yer, and the mother is a daughter of the
late Gov. Duncan, of Illinois. The
faunly consists of ten boys and one girl,
nonde and is a little nation in itself The boys

3 diffi- are natural-born scientists, artists and me-
ich is chanics. Besides cultivating a farm they
publish magazine, build boat, prepare
by a specimens of entomology, manufacture
rs that toys, teach school, and conclude the cata
stock" logue of their industries by writing for
aging the papers The publication is a hand-
somely printed magazine of twenty-four
ile di- pages, and contains many interesting
glish, original articles, most of them being
u, and from the pens of the Putnam family. In
r lan- their last issue they gave notice that the
sister, Bessie Putnam, is admined to the
limore Partnership, and that hereafter the firm
name will be Putnam Brothers & Sister.
hoops The Lembers of the firm are Joseph,
good,
hurch aged eighteen years; Charles, sevente.n;;
Juhu, fifteen; Henry, twelve; William,
eleven; George, eight, and Besse, seven.
Inter-Ocean.
elopes
Other
gram,
duced
ed to
ces, of
shuve
ns.
A Man-Eating Tree.
about in fold after told, ever tightening,
with the cruel swiltucgs and S3V-
43025
certai
Of 1
Pennay
South
Georgu
Total
Tota
West o
age tenacity of anacondas fastening upon
their prey. It was the barbarity of the Maine.
Laocoon without its beauty-this strange, New Y
horrible murder. And now the great
Michig
leaves rose slowly and stiffly like the arms Minnes
of a derrick, erected themselves in the Wiscon
air, approached one another and closed West
about the dead and hampered victim with Virgini
the silent force of a hydraulic press and North
the ruthless purpose of a thumb-screw. Florida
A moment more and, while I could see

the bases of these great levers pressing
more tightly toward each other, from Domin
their interstices there trickled down the
stalk of the tree great streams of the vis-
cid, honey-like fluid, mingled horribly
with the blood and oozing viscera of the
victim. At the sight of this the savage
hordes around me, yelling madly, bound-
ed forward, crowded to the tree, clasped doubt
it, and with cups, leaves, hands and
tongues got each one enough of the
liquor to send him mad and frantic. Then
ensued a grotesque and undescribably
hideous orgie, from which, even while its
convulsive madness was turning readily
into delirium and insensibility, Henrick
dragged me hurriedly away into the re-
cesses of the forest, hiding me from the
dangerous brutes and the brutes from me.
May I never see such a sight again!
Tota
The
pine
substi
iron-
pine i
ually
and w
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the m
the en
a rem
volver
even!
Thi

THE New York World publishes the
following unique production, said to have
been condensed from a Carlsruhe maga-
zine. The extract purports to be from a
any letter written by one Kurl Lecht, a trav-
eler in Madagascar. The writer says:
et that
In the course of my stay in the valley mand
to his barometer, but should think it not over
At the bottom of the valley (I had no of twenty-one days, I saw six other speci-them
mens of the Crinoida Dajecana, but none suffic]
r will 400 feet above the level of the sea) and so large as this which the Mkodos wor-suppl
loctor near its eastern extremity we came to shiped. I discovered that they are un- tion a
get it deep, tarn-like lake, about a mile indiam- questionably carnivorous, in the same clima
eter, the sluggish, oily waters of which sense that diona and drosera are insect count
ently, overflow into a tortuous, reedy canal that ivorous. The retracted leaves of the great
n one went unwillingly into the recesses of a tree kept their upright position during of the
king, black forest, jungle below, palm above. ten days, then, when I came again one the sc

five This lake was filled with alligators, and morning, they were prone again, the ten- the b
rump. its jungled borders were the home of the drils stretched, the palpi floating, and wher
lation chetah and a variety of venomousserpents. nothing but a white skull at the toot of and o
ig, in Great ferns bent over its margn, and its the tree to remind me of the sacrifice that valua
econd surface was spotted with leaves and flow- had taken place there. I climbed into a For t
■ the ers of the lotus. A path, diverging from neighboring tree and saw that all trace of jects
pedes its southern side, struck boldly for the the victim had disappeared and the cup mean
cerful impenetrable forest. Henrick lal the way
heart of the forbidding and seemingly was again supplied with the viscid fluid. ful in
"The along this path, I following closely, and
men, women and children. After we were
behind me a curious rabble of Mkodos,
fairly in the forest the shade overhead
was so dense that the jungle and under-
growth almost disappeared and instead
a damp, boggy turf, cold,
spongy, and yielding to the trad. The
in it stalks of the tall trees rose like columns,
Love the vines banging down from them in
Troy festoons, and their roots running over the
ground in every direction made walking
ou do
being
Pray
ere is
3." It
there was
of the imit
The indescribable rapidity and energy prese
of its movements may be inferred from elabo
the fact that I saw a smaller one seize, other
capture and destroy an active iittle lemur altho
which, dropping by accident upon it
while watching and grinning at me, in
vain endeavored to escape from the fatal
toils.
and ti
be to
for th
the st
With Henrick's assistance and the con- grow
that
sent of some of the head men of the grow
Mkodos (who, however, did not dare stay
to witness the act of sacrilege), I cut
full-g
down one of the minor trees and dissect germ
Stevens Point Journal
Stevens
Point, wisconsion
5/30/1874

[PAGE BREAK]

To
To
Sacrificed Man-Eating Plant
The
Remarkable
Experiences of
a Distinguished
Scientist in
Madagascar and How
Science Explains
the Existence of the
Monstrous Growths
Upon Which He
Has Made
Official Report
Ing cpward. A'T
A Central loc
ing stemET
ppt would MA
better name, I be
lieve that shit
eres constantly,
as tattated by
By Dr. B. H. William.
The Distinguished American Batanist
TL EARL LECHE the boted German
explorer and onlustat, ha brought
back from the wild ef ladagascar
ore of the most amazing alories that Las
ever come from the African lainad, in bas
described in the Carterae Jelentine Jour
nal a plant which sects to be an extror
dinary development of a certain curios
Cor of table life to which the ramos
Team Eytrap or pitcher plant. and other
insee: cateter and eating relatio
LORE The Nant, or iron, which be cal
Criacida Darjeras, mains. according to
Dr. Leche, a lze el ten feet. vand is pow
erful enougat and destru
was being The atas, the rite la
whose Lerritory it is found, revere Il a a
fetlet, and racrifice maidens of their tribe
to P. y Loche
A quarter of a century ago Americat
Comras la
rationed this tree
ader.fees to it by are in their
report
Before diseneeing the plant fruca che

1 quote almas fall
his s
re at it appears to be Science
Journal, web is a publication of Te
proachable conservalam and authority.
tad goes writes o Madagascar,
the land of the lemur, the lare plaat, the
are-are, and also of the ascating tree,
to vist Queen Exam and was per
Fuaded to visit the Whodos by a stire
who had heard that besides genereus dally
pay I was accustomed to reward liberally
anyone who showed me something strange
or out of the way.
In his car I forced to the
part the island. Inland
among the
forest where there is a Alatriet practically
unknown, who we visitors at be
bered at the facers of one hand. This
in the regten inated by the Medos
7: was walle arz these catirea that
Jail to what was probably the
most horrible right 1 have 200
Their religion rondsts in the worship of
thair sacred tree. care of the cost oder
lus freaks of nature. To this tree the
effer Susan C
Once upon a tim
as ech was cocted. I had teen
their custom to bars each tree TRIL
however, they had been forced to give >
on discovering that the trees were getting
to be very scarce. When I arrived they
were practiestly exist and with
dificulty that my galde, whose w
wild stories
tad attracted me to the place, ceuld fol
ane to show me.
southes covered with this virg
"The sacred free la mest remarkable In
appearance. Its trunk, whieb rarely rate
tea Jest bare the mound, is el a stra
shape, covered with equals:
movic sort
bar of bark, looking like soching
so much A gantle plampple. At the
top of this treak it is between eight and
nike feet in circumference, and upon is
xed a remarkable growth very much re
sabling a huge plate. From the top of
the trunk there hete eight hates
were of extrandary size, res is TE

fest long a feet wito where they were
hinged to the tree, widening to about two
feet, and Cnally tapering down to a point
as sharp as a needs. They were plent)
felly strewa with huge reco.us locking
The leaves could not have been less
than fifteen Inches thick in the centre, and
down inarily along the truck, their
pein trailing in the ea
earth Abore these
here stretched rigidly and hortanntally,
A number of branches several test ta
lecots Finally from underneath the
plate-like, arrangemed, there grew, patat
strong wind
1 eeems the
patele atr
top of the k
contained DE
thick rest f
This tecld, which
is a product of
the tree and
probably righ
ally faded to
ettract birds is
highly intexicat
ar. 2E ETED A
very small qua
lity Tors BOCE
produces COMEL
sacrifices
FIG. 1
FIG. 3
TIG
How the Vests Rytrip
Capteres Insects: (1) The
Fly Alighting Upon the
Leaf; (2) the Fly Is Stack
Fast Upon the Wisco
Substance
with Which It
is Covered and the Lesf
Begins to Carl Abeet It
(3) the Leal Holding the
Fly Now Securely in Place,
and (4) the Best Plant
Digating the Insect. After
It Has Digrated the Car
All of the Fly Is Dropped
and the Lest le Opened
for Another Victim
take place a woman is forced to climb

the tree and drick 1 be devil Inside la
in good humor, then the girl will be al
lowed to get down agata in safety he
waits feeling Ry, however then the pour
girl was out et hack Eractly how the tree
went ber jag down
could not make eat, but I was to less
eventually
desired to draw closer and camis
the tree carefully, bat my guide berrel
not to. Warning me that the tree ged
would certainly be angered my sa
age and would take my life in re
explaining that the leaves would rise up
and crush me. Of course I did zet 747
chattection to this, but nevertheless,
belt the tree alone. for it has always be
my kabit to respect native superstitions
Bad eastoma.
One evening my guide presented br
elf to me and told me that what he had
beam waltat for would take place that
Tat it having made the chile?
present to ixare that I would be weleama
to witness their ceremony, I followed the
tribe into the forest. They made their way
to the sacred tree, and read batt
twelve res so that the Dola ser
i were lit ce trichly. Then ther
poned themselves about them and made
themselves at home, souse eating, but mast
of them crining huge gourdes of native
ferment Very soon they were all of the
more or less intoxicated, both the ma
The womes with the exception of a roGNE
girl rearby, who neither spoke or moved.
ut glanced about her as if she were terr
ted out of her wit
oldenly without warning the yelling
ceased and they scattered away friest
ened Cear. The crucial point had arrived.
Por a moment there was complete silen
bet for the cracking of the fres. Intan
told me that the girl I had noted befors
was the as that was to be the sacrince,
looked at her and saw mortal ferror h
printed en ber features. Yet for the life
I could not torace why, and t
down her fear to imaginatica
"By now the first group of dancers had
recovered, and rudely priar
lag up, rushed upon the poor girl with
earthly shrieks and yalls. They used

ed her, and with sbosts an
Gered her to climb the t
•crea. Terri of
shrank back, apparently begging for party.
At that the whole crowd jetasd ada
ously howling at her to obey pace.
the dancers gave out their orders; the
"The tree, sectingly to dead and motionless a moment before, bad
Come to life. The palpi, o frail locking, had suddenly ceased to
quiver, and had coiled themselves about the girls head and shoulders,
holding her so firmly that all her
efforts to free herself remained ab
solutely useless."
A Remarkable Photograph
of a Rat That Has Been
Caught and Killed by a
Giant Specics of the Pitch-
er Plant la the Cap of
This Plant Is Secreted a
Sweet But Stupefying Liq-
vid. The Rat Has Drunk
of This and the Plant Has
Closed Upon It and Smoth-
ered It, the Flanges Hold-
ing the Body Tightly in
Place.
as she still reded and struggled they
armed themselves with spears, and
blag at ber forced her la retreat in the
direction of the devil god. For a while se
resisted, seeking to hold their
berbands, and only
reward for her ptseky deta
"AL last, sestig It was eles to g
farther, she turned and theed Le tree
For a moment she stood still gathering
herself for a saprese earth
ly she sprang toward the tree. Lea
the p knelt and crank of the bely inquld
Quickly 13 Jumped up agala, end 1 ex
pected to see her fump down atak
was crer, is that dia light sot
Instantly what causad her so to shriek with
Lerror
udenty real and what was happen
Ing. and 7 edemed to be paralysed with
1800. Intemational Feature Servis Zac
which the maddened natives fought and
trod each other down to gate mothal
of-the Intesting fald from the tree and
the blood of the human ri
Then the feasting began again smid
ach rejoice. The devil was appeasel"

The plant deserted by Dr. Lathe has
perts fa con, grans with the
Team Bytrap than any other. This pecu
Har spectra is farad nowhere in th
world excwal the way districts of
North Carolics, and we there is quite
are. Ruhsints by estehing and matte
ties and other sect Dr Cenge W
Cris. prefemer af sargry ta the Wate
Pesarre Unversity and our greatest war
sergees in France and aether of surgical
Cooks on the war, is authority upa De
babits and amoy of this plant.
201
Iban place, low-growing
plant, peculiar to Joggy. places. All day
lex to trapless W
the prey. On Love made surtices of each
Bivalvete maf is soms sticky recith
ata, attractive to resects Abbego
an lucky typing step
into one of the traps. Instantly cloves
spes him with a sp and he is a "r"
Case of are of the
tapkaveveals the tast that three very
mute hairs spring from the mills of the
ide of each at its caFICK THE A
touch upen ee of these bars (which
sitive per
makes the pirmt
aware of the pres
esce of the fy, and
the "clamabell
with the point of a
If ena of the hals
be touched by
lead pencil the trap
vil instantly dos
The plant does not
know the derme
it shpky roa
ration. Bat the
touch of the penell
must not be too Eight
or too heavy; It must
be Just enough to
flate, the contact
ety or her
sect Ita
smart blow be stack
the trap will not r
spond at all; 2
epet.

Bowever,
that it is a real ty
The trap close, its
margal in
turlocking to prevent
escape of the prey.
Flows than T
markable pesme
nen. The trap bo
coms & mintater
alomach which at
esca begs to set
A Warrior of the Mkodos, the
Tribe That Sacrifices Women, Ac-
cording to Dr. Leche, to the Ex-
traordinary Madagascar Plant.
cas de rapidly sedly hansted by re
peated sumalation.
Finally, mys Dr. C, the plant bo
exposed to the faces of ether or chloro-
form, loses esclosaness for the time
being. Just like a man, and a traps to not
respond to irritation while the effect of
thetic lants. The falaiset end mest
appetixing Ey cED walk all over them with
out perf of capture
The tree described by Dr. Lecke would
seem to be anated by the same g
toricas reacties as activate the Yea
Sytrap
And this mechanis mysterions,
deed! Many plants exhibit all the pheno
meza of nervous reactions. The res
Sensitive plast, which belongs to the
Mimosa family, and which close its leares
not only at a touch, bat actually at
den abrupt and, would em la predicata
tactile se
bat bearing The p
ler that title growth and clowns of
Cuman band and opening and cler
ing of the Satative plant leaves are pre-
cely the same. How are these realices
carried and what the governing body
valch produces the reactiens am the
vensutions?
Archea of the Dr. Bo
the Hinds scientist, bure recally thrown
great light upea the matter, and they
far toward venas Dr. Lecha's story.
By means of mantteation and certala ar
rangements of intense lights Dr. Dose v
mabled to produce actual pictures of a

Photograph of the Peculiar Leaves of the red pump and re. While the p
Venus Flytrap Opened and Closed.
barrer. The Eee, seemingly dead and
Dotionless a moment before, had cons.to
ilta. The paint, no fail lookiar, had sad
denly ceased to river, and had coed
Drives about the load and abo
ders, holding her so shy that all her
Corts to free herait rsmed sholately
tion of the captured
irect
The process of digestion requires a
ber of days, during which the trap remates
stat This being anally accomplished
opens, draps cut the reuse et the ea
Dr. Crile says that the plast its
astach power of perception and
The green branches sa rigid before bedcriminatla sa treg-a creature that
pata wife, and called themselves round
and round the makes Then as the mASS
reggied there are a borrble
hall never forget the great learca Segaa
The evit
tn rise, slewly, very slowly
locking therms were now on the last
polating toward the victa and closing ca
bar with tha tares of a hydraulic po
"As hy aadly ther
tickled down the trunk a plakish mixture,
Oreat Brie Rev
undeniably poses amid catches
Deseats and digests them, and shoots the
ref: A tros does the sa, respond to
to the stimulus of the w at of a fly as the
Estrau pands to the teach of the fract
Live baits of ce of the tra
be repeatedly touched in just the rig
WSW map stat axle and a
st not more than three or mar CICDES.
The energy of the plaat, he that of man,
seam to have to threach
there is a tremendous rezsitivezes to
tween their calls. The calls are. Indeed,
a granulated nerve. The comparison mint
be made that Instead of a wire such as
SAFEWAY be likened to the plant BATE
with power of
C
s of all es auch to the
other. What and where the directing force
matrace what and where is the
plant base of the mysteries sc
ce stall have to reveal

Intem as the interest the story of th
Madagascar tree has accused abs
ists, there are few who will dare say it is
pose it la to be teped that a ki
the expedita will soon go to the place
ladicated by the German explorer
make a careful aty et the extr
plant.

[PAGE BREAK]

SIGHT
OAKLAND TRIBUNE MAGAZINE, SEPTEMBER 7, 1924
NINE
Fresh Tidings of Madagascar's
Weird Man Eating Tree"
Above, left, is sho
Venus Flytrap, far int
catching plant, of which the
eating tres may be a paperit
Han Chase Salmon Osborn. fer-
Governor of Michigan, ly
Asseritan member of the Afedagus-
car Academy of Science
At right is pictured the
Pitcher Pient, dressin
anch in all
This Monstrous Tree Has Spiked
Leaves 12 Feet Long and Ser-
peni-Like Teils, and Literally
Devours Human Victims Offered
as Living Sacrifices by Prunitive,
Savage Tribes, According to
Story Brought Back by Dr. Chase
Salmon Osbom. cr-Governor of
Michigan an Experienced Tiny-
eler, Who Has Explored the
Length, Breadth of Madagascar
Ry F. Cregory Harlucick
SIR ARTHUR CONAN DOYLE giant ■ymps add to th
by the lof en Anne, lower spare plaat het
Vinz anglich all
alent vous embed
lahol his literers with a warm
The wira mas marira tre
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1. Dol ersch
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& valley molla "Phimp ad." The jaws, with the other drive
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man. The band 'n wait the plan' attract their hybr
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bat of the plant to coomal welf the and one their bears, tuy
The and dermed by the ward with spikes, over the ro
which at files to her loves by
traje Tiptop Gele"
w of marwes da lig trees.
One mesing two men centralal vis
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esting The erased
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Tup a leen tamen over at the
Hotel Claremont
Berkeley, California
Sanday Eve
Dinners
Sunday Lunchtons
[AD] $1.50
75c
Duner Dance every Saturday
Night with Excel $1.50
Leat Orchestra.
Telephone Derkery i
Sir Arthur mlades is story
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Jer at ever lil" replies the wher
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of California them wald are been
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Time," Dr.
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James Cahill & Co.
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of the vision.
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"Ai tha sht ta arge forks

By S
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Jurand, belt the tree and with
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the be as the ramen, of m
And that He si te insti
Maletit a latter written bi r
faith free the hand by the A
Chola Treh ailecary, la Lis
Abbe de Marire la Franes was, vien
priatel diresia's), realet by
that in when plan there. I likheders mire ca the
of ears, wh
timeble. No the L: A
Dom stantong
forensics onld be literally true
No before scaling at the tory!
all tree the virile hal le
and
at the map was in my
with for
This la the villal neemt of
an order. In
of his story I Chern rits the h
To legals of the free rack the maxi
rimila ang Ulies, and the
fast at own mlaelenaries, whos
daty is to driva el partition.
The pbility and mark that the
marks of trivel legend on the m
Jot be willt endation le
fort
Dr. Grates that ligh hea
tranched the leath and ch of
Madger be retain
bet

De pedelem, wild-
regat is religios, enda anle
alamin and
mye alinat It Ta such a territory,
ebes intences t
cult and danger el a legen
ply whale
The its ef Malega
laecepsel et te
tribe, are fairly clind dat
ail the type of com sheh
wall le maly by kl. Dr.
Ol's description of the all
bals the start art ther
part of the world premen's moch a ju
"The retracted leaves of the great potion of the wind the
ik dragged me away
in in the verses of the farrel Nay I
as a sight int
Intonator's works have
never been led and there are l
ps on plate that a hat not
felly maligach it may eas
foratals explorer of watcom
thm to be the first will as
the days of Carle Labs to w
pon this wat siege not
of all
wor
Why Don't You
Reduce?
Pr

[PAGE BREAK]

30-WED., OCT. 28, 1964-NORTH HILLS NEWS-RECORD!
In the Woods
by
FRANK W. SULLIVAN
Fact or fiction?
From time to time, rumors urid reports appear in
newspapers, books, and magazines about the possibili
ty of living dinosaurs or other such monsters. Those who
make these reports hold that many strange creatures!
walk ur world of which we know nothing Strange plants,|
lost worlds, and lost civilizations
are all such rumors false?.
Quien sabe?
ture which extended several
yards in back of the body hump. I
Vi
ave read such reports and in at the head lowered. The ani- is
have read such reports and in mal was feeding

Dave
a hom
some cases jolted down nutes The upper part of the body
In the year 1922 the newspapers undulated as the anunal moved
carried reports about a pleslo- about Again the head was rais
saur that supposed to be living ed as it were looking for a mate!
in a South American Lake. or perhaps an enemy. This ume,
The Plesiosaurs were com- it turned first in one direction.
mon in the Jurassic Oceans of, then another. Then it started Braves
many millions of years ago and to move through the grass, its
their contemporaries were the bead held high. Now I could see crowd a
early sea turtles and marine uz it clearly all except the lower second
ards.
Freeport
I could never find any Umbs and feet.
more information on this sn- The front legs seemed to be Whart
called sighting.
shorter than the rear ones. Per Luck a
Another such report was madelhaps that accountd for the long caused L
Bome years ago by Richard D'high neck that enabled the ani- the ball
Orsay, American explorer andjmal to see about. The skin was,
hunter. He reports actually!a dull,
grayish brown, but yard Uni
watching a prehistoric monster could see no signs of scales. The Freep
feeding. I still have this yellow-eyes were small. I could bare-ves In
ed and faded report and will ly make them out and hardly ground 1
quote D'Orsay's own words in well enough describe them seat to
regards to what he claims to The tall sometimes dragged and
have seen.
moved sideways slowly and de- West I
Mr. D'Orsay, at the ume of liberately
'big fram
his report, was in his forties, a "I remembered the pictures I covered
well educated man, French by had seen of reconstructed dino-John Ro
birth and American by natur-saurs. This was one of them 26. The
alization. He has spent many surely. though it was not quite, Dave Ki
years in the remote, desolate, as large as the pictures in my 'he next
mountains and valley waters of mind made it. This animal could al into t
the Amazon River, in Central have been no more than 30 feet wood in
Ecuador, searching for an Inca un over all length, whereas ske-
treasure. Now let us tell his letons I had observed in mu-
A Ka
story
Iseums were 40 to 60 feet long. bass sco
"Within this vastness are vel- "Slowly my 20th Century dino- Freepo
leys through which tumbling saur moved away until I could tack in
waters flow, plains of waist-high see anly the head and upper time tne
grass, forests, chasms and boul- part of the long neck. Finally, ed, they
ders of enormous size. It is way the morning clouds settled down Brave li
off the beaten track, in a vast and soon a faint mist began to ni, B
area of valleys and peaks in the fall."
Andes. On the east is an impene
brand.

trable section of unexplored jun- This is Mr D'Orsay's eye wit With
gle. On the other sides are ness account which is twenty to go.]
mountains that even a burro years old and, to date. I havel Wesl De
cannot climb
not heard any other reports of one. an
"On one day of my search him or his monster.
Freeport
had crassed a plain of some 20 For many years the reports ball and
or more square miles that was of the Komodo Uzards was scoff- frrm U
up to my hips in long, wiry ed at as being untrue and the good as
grass. Although I crossed only figment of someone's imagina- West.
a corner of this plain, it bad llon. Biologists and other mea victory
taken me a full eight hours of science held that if such crea-n Oct
struggle to negotiate, a few tures existed reptiles of over
milles.
500 pounds, which could küll a
The B
"Most days in this region are deer or a man-we would have Joint on
Cibway and visitonity is rarely known about themn
good for over a mile. But the Yet, as so often happens the Ro
Dext morning,
I could look Komodo lizard story turned out!
across from the mountain side to be true and was verified by
to see range after range of roll-scientific authority a few years def
ing mountains, stretching away after the rumor had been de
towards the Amazon Territory. nied. Komodo Island is there Ath
"My gaze wandered down in- and so are the hoge lizards.
St All
to the valley below that I bad What of such weird myster-
cruised the day before. It stop-les as a man-eating tree giant ball tear
ped short and quick. No. I didn't spiders and a huge bird sup- game Sa
rub my eyes. I knew I wasn't used to exist in Madagascar to St. R
dreaming My eyes had never What of the bangman vines and eleven h
been opened so wide before. butterflies of death reported ions aga
"Here, below me, less than rom the fastness of Costa Rica?
mle away, an animal was Truth or falsehood? What of
grazing. But what an animal! giant Anaconda snakes, 50 feet
This animal was a plant feeder in length? Can this be true?
for as it moved along, the head What do you think?
would dip and come up with a
mouthful of the long grass that;
clearly protruded from each
side of its jaw.
Too Soon
Both tou
es
St. Ath
the St
tackled t
,a safety.
The W
Graveyard of the elephants,
missed a

Cleopatra's Tomb,
"The head of this creature!
zinger pa
Lost cities of the Amazon fourth co
was not so big, but it was plac, black bullerflies of doom
ed on a neck that must have The coelocanth fish of evolu- worthw
been three yards long The lion. the first night to the moon, he yard
The Ju
its winni
hump of its body was clearly!
Do dinosaurs still trod the overl
discernible above the hip-high arth deep in Angola's gloom?
grass. I could make out a slow Thoughts like this do fill my
movement of a tail-like struc mind, une lifetime is too soon score of
Name in
Marty
TDs. Me
Warrendale, PA

[PAGE BREAK]

SOME ODD STORIES.
es
to p
Mada
24
ER,
sea of
ss ex-
DR.
ITED
rated
Hunt of
it the
bed
INTERESTING TALES OF ADVENTURE
ON BEA AND LAND.
The Search For the Man Eating Tone of
Ceylon and Its Fatal Terminalles-The
Demily Tallty sad Ita fystery-An Exp
als Army O's Hory.
Mugs right, 1800, by Aria Prem Armein-
tlen.]
was diststrand by no sound save our time
ech
WEDNESDAY, OCTOBER 1893
phimola
of borrar probally and early emp
As we slowly want a tertianis gives
ever me, although I tried to throw it o
In that tiny was thing, Geta
any alat the valley-something wind
aldeadly Inked at the pain and

www lls fans was pale, although bis jaws
wwwal letetion who witty an
features.
"In rain we looked as for sm of
living creature in that dismal sale No
bird ver naitaal getel or visit
even a toks squimel ACTO path.
For all of Le ploem, the vegetation was
turions and rank. bit the air seemed
laden with perfumes that were eweet to the,
potat of all.
"It was soetblag more than the lore of
sport and adventure that took me back to
Ceylm for a seccod vlaft," said Major Car
(er of ber umjesty's service. "I had re
wirl to seire the mystery of Lirutessa
"In a short time we came to a wall of
Gorlat's mest unaccountable dipper
batta stone A ery broke from my pa
aker on that wild feland Give swam infornatonin peked up a rusty tile that
lay at the fact of the wall
examination I amerrel
Afra min
Gerdan was a ne fellow, young, darles
and enthusiastic, with a paisleg fature
med pen wymi
I had aftra heard weird stories of the
man killing tree of Ceylon, but I did not
bellero there was the least foundation for
for I had found a man wight rest in he
rurity beamath the so called deadly up
and the story of the was never
Improlable as that of the feudish tree maid
to live on flesh and blood
"Livaleaal Conlan bal shared my
acepticism to a certain extent, and yex be
was loclinal to vrch for the demon tree
IN THE DEADLY MESTER
La dark depths of the wildest fangles He
had daring and dangeroes way at ra
Ming far into the forests, his only en-
pong bative puide and a dark
Lmned at More than one I toad
him to would pride a warm for
tiger or some other wild animal, bas he
only laughed at sy fears,
One night ho did not return. The ide
and the servant me back, both Diabl
card curly to death, and they told a stary
that arcase our party to
to a high
excitement They declared Liestenast
Gordan bad fallen a victim to the man ext

Jag tree, saying it was near midafternoon
when they came to the math of a deep Anel
1 dark valley, into whink the vers
young man tesisted on penetrating Ar
the mouth of the ralley the antives found
a small store idol, before which were sent
3tered banan skulls and bones. This nervel
to warn kem patost entering the forbid
ding and they refused to smpany
the litt
L.
"Gordan was not daunted, and be inde
them a wall his return, after which be be
ly went down into the gloom of the pl
lvlag the bali nabling mal p
trating themselves before the wel
"La about o minates the pain and the
Sarrent hol a terrible abriek of fear and
acay that came up from the mysterious
and dismal valley. The cry was that of a
human being in the greatest aguay, and so
in the natives that thes
sly took to their beels and fel fra the
apot.
"We rabaked them for their cowardice.
and all of us belleved Guadan bad bem at-
tacked by a wild animal or a serpent. The
enlerlaid hope that he might
an appearance, but the night passed and
marulez came witbol y elgu of him
The newly the esire party set out to fad
the dismal valley and solve the roysters of
our comrada's fate
"The gulle was very reactant about
landing us, but we forced him to do m
For boars we trampel about to the jangle
without finding the valley, and the gulds
Anally declared he did nes know how to
lead us to IL The ade us very angry,
and wa early scared the fellow to death
averting we would fay him alive if he did
but take a to the plzen. Ile started on
again, and we followed, but sight Couml us
arewarded for mur pan. In returning in
the camp, both the guide and Gonda
servant lipped away and Cisappeared in
the forest, and betther was seen afterward.
"This is serious air threw a lamper
Coal on our sptries, and the buat was far from a
Fuers. The taost of the party were in
clined to believe the lieutenant had b
mordered by the two nail vas, and I thoughs
Improbab

ed
g
"During the Are rears that elapsed b
fore I
I again visited Cerke, I often th
of Jack Gorda and longed to know the
trath conserning his fate. When I found
myself once more in the vicinity at our
former adventures. I resolved to search for
the fatal valley Captain Starbnek, a loyal
friend and a man with pleaty of courage,
rtion. agreed to
me, poor fellow 1
ward to hart a white rean at a
lom, although I protestat again raking
him from his elephans shooting, but be
professed sous Lalth is the story of the
Au reling and expressed a desire to
THOW
ELL
look upon the monster of the regrtable
GET kingdom
".
Rece
ladder,
Ibers.
Tphile
Taking our servants alouz we de
party of four, although we knew we eeld
not depend on the blackskins in case of
emergency. I was var midlar of rar
first and final search that we came to tbm
mouth of a valley that med to me lika
the one described by the narire guide a
Gordan Bryant. All at coce bech car
darky aids Bung beanselve lace dann
ward en the ground nad eu mantin
solute detalles, and
then we saw they were bel beler 1
tobe luge, atuand which were real-
tered bones and
The Lase
the latal valley?
cried
"It was selera to attempt to perinade
tlin blackskins in arconiy the th
ths of or piar, and thus extinctio
und to gore, sasient ter
colas forth Is t Fred Telling
to na nar ters al landing in s
Our were how to tra
P. We iteral the valley
A dery g'or love the pie which

This was Liecremant Oordan's m
an account of our cur
witneel from the top et
tala - w Norwe
gas fest In Telemarken, south of Ser
way. We were a party of two labe
and three tietura on the samir
lida mu on Arg. L. Onlar
ing of that day 1e sky was passably
clear ut sun three was a thick fo
Between 6 and 7 o'clock in tier afternoon
(the wind bring soch to wathwe) the
for lenly clearest in plasm
we coull see the surronhng country lu
sanebine through the rifts
THE GR
NER
Stoma
We mounted to the flagstaff to order The Most A
to obtain a better view of the scenery
the
and there we at once obeerted L
fog, in an ererly direction, a demble
It Is Pleas
rainbow fortaing a complete circle and
wing to be 20 feet to 20 feet distant
ly valor total hollow and strange
appeared as black, ryees and nearly life
I beeked up at the red wall wel walle houette. The outlives of the
iou tel CaptainStartnick nodded, ilbonettes were so sharp that we could
and we were som elimbing side by side esily revognim the figura of each other
As wrated wpward galar
seand came to our ears. It was a sert ef
wible or him like the sound of s
strong wind la rank reda, and yet wallhe
This
litt
the tep of the wall, and there was some-
thing blood chilling la the s
"The top was sen reached, and we looked
over lato a direular basla, is the very c
ter of which resize that was el a vir
ly grease from smuts in it
paint. And sech a treef There were DO
leaves open it, ml Lis bare bruerbes were
round and expple. like so many werpents
From its boty to the upper limit the tre
was it at The Almeler limbs were
whipping and eattrag through the air like
things of life, making the letningsoned we
brand.
"A cry of ant brake from Star
bock's lip. In an instant the tree was

still, and every branch stated stralcbt at
At that monest I lost my footing and
slipped back a lil, falling below the level
of the wall's highest point. I felt some
thing knuck my has from my head, and
then I heard a terrible shrink from my
I twinlag, tws labell
things encircle
and every movement tras reproduel
The brad of each individual appearei to
secaps the center of the circle, and earh
of us seemed to be standing on the inner
periphery of the rainbow. We estimate
the lawr radius of the circle to be six
feet.
This phenomenon lasted several mis
res, disappeartag with the fog lank to
be reproduced in new fog three or four
times, but each tha mere falistinerly
The sanabine daring the phenomenon
errmel to us to be unctually bright
the Telemarken Tourist clab, writes to
Mr. Kielland-Torkildsen, president of
of Gauria has twice seen spectacles of
me that the builder of the but on the top
this kind, bat in each case it was only
the catline of the mountain that was
reflected on the fog. He had never men
his un leage, and he does not mention
circular or other rainbows."
Strange Munn Antipathies.
Amatus Lesitanus relates the case of a
Mim and match him from view in a twin-monk who would faint en seeing & rose,
Alfing. For mot others played and and who never quitted his cell at the
equirmed over the wall as if feeling ferma, monastery while that flower was bloote-
and then they vanbbed.
A short time I chung there, paralysed
with such horror AS er possed me be
fore, and then I drew myself up to the top
of the wall gain. I ever forget the
horrible sight that greeted my eyes Cap
tain Sumback way to the grep of Li
demon tree, the Ilaba ef whleli were twined
abons hlas ka serpents. Some had twisted
Lemieters abort ka neck, and I saw he
was already del, baring bee stranded
And ever line healy the seaky arms of the
Lee loughin
and falastag with terror, 1 ad
It is Safe i
This wonderfu
South American S
agent has long ber

who have not brow
general publie
This indicine
gestion, dyspepala.
also of the greatest
whatever cause. It
which it possesses,
organs, the stomac
will this wonderful
ener of the life for
broken down ross!
the treatment and
remedy ever used c
ousness of females
period known as ch
Tonic, almost cons
carry them safely
tire la of inestimat
energizing properti
or fifteen years to t
bottles of the reme
IT IS A GRE
Nervousness,
Nervous Prostration
Nervous Ileadache,
Bick Headache,
Female Weakness,
Nervous Chilla,
Paralysis,
Nervous l'aroxys
Orfila talis how Vinceal, the Test
painter, would wwoon upon going into a
room in which roses were blooming
ven though he did not me them Val-Nervous Cooking.
Hot Flashes,
Palpitation of the
Mental Desponden
Sleeplessness,
bald tells of an army ollicer who was
frequently thrown into violent convul
sion by wwwing la contact with the
little Eower known as the plak.
Orfila, our authority on the case of
Vincent, the painter above related, also
tella of the case of a lady 46 years of age.
bale and hearty, whn, if pemnt when
seed was being bolled for any purpose.
would ba catred with violent fits of cough-
town to the foot of the wall and run from
that infernal pot fast as my legs could
carry me. I dai ne atop the 1 rearland
the mouth of the demilly valley, al ling, &relling of tim face and partial
Leo tives, reading the trash on my face, loss of reason for the seing hours.

kept the company.
Writing of them peculiar untipathies and
When I told the story as camp, 13 warersinus, Mentages remark that le
received with lalel douland eredalty. has known men of onlor.hted extrage
Rome et the men cooit not laing thes
bo would much rather fave a shower
of canon ball than to look at an applet
La Zamera's waiting there is a se
reives to belier ach chia ponible.
while others knowing me better, did not
doubt my worl
of a lady who could not bear to
touh either silk or atin, and who would
also faint if by accident she should
happen to tach ti reivery alta of a
ch
- pre daya amarebing far rise
valley, and, singular a. i may
eenid nos bo ter degils I do so know
that it has been found to this day. Be
were able to go direct to it," conelenind
Major Carter, "the wealth of Engtarl
would at lempute ia borrid
A bark's
We had on beand the brig Emma Lam
fall bloodel natire of the death Ben laads
whom we called Kallos, which is the name
of the place where he belonged. Kailua
was er his way hack bome after a vids to
estilata, sud bas un rery happy. He
was a supple, sinewy fellow, with a restles
eye alakand that could now with the
wwiftness of a flash. He had picked up a
enstain amount of broken English, and he
was very paved of his scevaplishment
For some days a huge abark had been fol
lowing, and the perito sailors de-
clared it was an emen of evil. They reler
aled time after time that some calamity
was bound to hetall us. Finally we were
becalul la brasa sky and in the
mids of Test, Flemynan Sull the
shark played about us, his back in cutting
the surface of the water here and there
s of death," soberly de
clared one old ter
Kailea beard the wards and nodded.
"omebody est," be mkt "Kalies
We did nos fallen the meaning of bis
medi notil he had swiftly stripped off lys
elthes and plauged over the rail bonding
falo the un. Everybody rushed to the side
anal yelled at him to come back, for be was

mming wiftly from the brig se
thing gripped in his teeth. Ir pasi n
the last attention to our cre
It was long before the man esIRT
sighted the swimmer, and we saw the
barp an eating through the water like a
A feeling of multerable borror
Burrak
Belard every one of us, and we watched for
the consummation of the tragedy.
The the Irlanders are the
swimmers, but all al cece Kallua
Doyle records the cam of a man who
ww.dum beartag the wish of
a broom Bern the foor, and of another
wilbs natural abbornner Iur honey
Hippocrates of old tells of une Nicor
sound of a Bute
who would always woon on hearing the
Bacon, the greas Englishman, call
St. Vilus' Dance,
Nervousness of Fe
Nermeness of Oi
Neuralgia.
Pains in the Heart,
Pains in the Tack,
Falling Heal b.
All these and
NER
As a cure for
able to compare w
harmless in all its
delicate individual
famliy is heir are
tinn. When there
general state of de
result Starved ne
right kind of food
disappear as the no
the power by which
rat to suffer for
ant bear to are a lunar eclipse and al-tain a seffent
ways completely collapsed upon such oc-
slums, and Vangholm, the great Ger-
spostaman, who had killed hun
dreds of wild boars, would fant if he but
got a glimpse of a roustril pig.
The Pepper POL
the wear our preset
For this reason it
This South Ataeric
essential elements
for its universal

rangement
CLAWFORDITT
To the Greet South
DAR GES:-)
have red for many yo
darf est
&uld bear of
say appreciable
d
in
Fryer Cleat outh &
and amach and List
Some years ago an Englishman who
had been a realdant of Gallard
to Sonthampton. Scarcely had he got
well inside the portals of his hotel than
bo tenentiaeatly asked for pepper pol
He had learned to love the dish during
his sunland esile. His requests were in
vain, not caly fn Sonthampton, bat in
London, and his importunity atunishal pay the
the waiters as much as that of young
Twist currisel the famous Dumble
Then,d be at last in despair, -1
will back," and be returned to Deme
Tara by the next Royal Mail boat.
prived at its worl
Lore the vale of th
JA HARREL
A SWORN C
My daughter, eles
or Chorra Weg
vine and she is com
Vitur Dance. I ha
the greatest remedy
farman of Nervous L
State of Indian
Montgomery Co
It is further related of a repeted old
celonist, a native of Britain north of the
Tweed, that he was able. thrungb the
fatelligent devotion of his cook, to main-
taia a pepper pot tre years. A new cook
rose, unbappily, who scarcely grasped
the extent of his master's partiahty for
this peculiar and perennial dish. Ile
erale the floating ingredients and de-
yed the pepper pot. As a result, the INDIGES
seemed to become confused or frightened, ly Set arly saccumbed to an apo
for he began to splash and flounder alot
In the rod awkward manner The shark
Gist have felt sure of his feast.
Netic attack. When be was sufficient

ly recovered, I had to mercy on his
fataless servant. who had committed a
sin locally unpardonable. These anec
dits, which hail from the home of the
pepper pot serve to show that it is held
Do common ester m-Gentleman's
Jam as we expected to see the man rate
ale prey. Kallas disappeared like
flash. It was he possible to tell how he did
it, but he seemed to dire downslate the wa
ter as if be bad planged bradlong from a p Mga
great belght
udden urry
sarfare, tu bich rear bribs crimen
stein, and them wp came alark hads that
turnel over on its side and lay still:
It was the shark, and be was dead an be
conlit be
to
Bas where wa Kailua We baked about
for the native in vain, and all be
think he had been killed and the body hat
sunk to the
Jas
at this coelusion a hail cacin fre
the bow of the trip al then was halina.
having under water from th
of the
Renconter to the La L
rape was Inflately ang to him.
demand hand or hand with
the ality of an, akuife gripped
historickly be sto
Tckts
hark - of dut." well
bet: Hiradial. That nashr right Ken
The dictate br
Lesti lar The rare-as ecri th
heal, whir the wall w
thost hour to aneu ad to by
art ben rape L
& Cylone w
One of the most peculiar resalts of a
elope est le wen in east Jar konrilla
A large al tren was twistal by the
force of the win! half way round, yet
food right and there are no
efs or cracks valule open its surfa
This in 11-7 wel not be so peculiar
were it not for the fact that tree st
- in its new patra al U limi
which were present
rng the Get The of the

tow to produally it so that it wil
ntualir d'e, bat i lark wems to
bate remained unhad niet. and
the tenanty-Fon
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Newark Daily Advocate
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Newark, ohio
10-4-1893

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T, DIVNEDDEN, CA.
Found It Impossible to
..L
Locate Man-Eating Tree
There are undoubtedly plants
which entrap and devour insects,
am one from India which fures
lee by an odor and traps and con-
sunies the rodeni, but no one has
been able to prove the existence of
the "an-enling tree of Madagas
r." This story was started about

half a century ago by traveler
who wrote a letter to a friend is
Europe of having witnessed a sac-
rificial ceremony where a woman
was tuarle a martyr, forced to meet
dea! In the embrace of one of
these trees. The story traveled
around the world and persisted to
such an extent that many travelers
and scientists who bave visited the
country since have made efforts to
verify the story. Dr. Ralph Linton
of the Field authropological expedi-
tion spent two years in Madagascar
and tried to locate a ma-euting
free. 1le encountered several per-
sous who believed that such a thing
existed, but the tree was always in
some other part of the country, and
be arrived at the conclusion tbac
the story was a myth.
now
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Daily Independent.
Monessen I
PA
1-23-1931

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lincoln evening news - lincoln nebraska 0-8-26-1903
THE LINCOLN EVENING NE
The East Show Window Presents a Pleasing Study in Black.
A Study in Black!
This is a "How" advertisement.
When you understand its
import you will greet it with a cordial "How do you do."
. The announcement concerns black dress goods for men.
The materials are the crowning products of the looms. In
these patterns are Black Thibets, Black Undressed Worsteds,
Black Clay Weaves and Black Granite Cloths.
In styles there is simply nothing lett to be desired. All are
the freshest creations-the latest Fall and Winter, 1903, output.
Among the styles will be observed in sacks: The new regulation
single-breasted, the Varsity (copyrighted), the English 3-button,
the Military and the regulation cut. Also the 3 and 4-bution
double-breasted Varsity. In the Cutaway Frocks, all the new
lengths. In the Prince Alberts, all the newest designs.
We said this was a "How" advertisement. We mean it. It
tells you how to dress correctly and just as good as the exclusive
tailor's patrons at a saving of from $10.00 to $30.00 on the suit.
The formula is simple.
Out of this stock select the style that becomes you best. Try

it on. If.it fits you here it will fit you at home. And if it don't fit you don't take it. There's an advantage over the made-to-order. There's no paying for something just because you ordered on board as soon as the Doniel party reaches Sydney.

Following out the plan of d'Albertis, Who penetrated farther into the. interfor than any other explorer in a steam launch on the Fly river. Major Daniels has provided himself with a similar. yesse, though of a more modern make. Romills, in his work on New Guinea, says that the explorers can only hope. to penetrate to the interior by following some large water course, as the mountains which come down almost to the coast on every side of the laland are practically impassable.

In 1878; a gald prospecting party, headed by Andrew Goldie. landed on the eastern spur of the island and attempted to scale the first mountain range. They found the jungle so. thick that they were forced to cut their way through with axes. They made less than two miles a day and were finally stricken with fever and were forced to turn back before they reached the summit of the brst range. It is known, however, that beyond this range there is another of high peaks and wild solitudes, but what les betwen the two langes or what lles beyond the second one, no one has ever been able to even surmise.-

D'Albertis says that in a country of such mountaingus aspect there is almost certain to be great "mineral wealth. The climate and the scarcity of. good water in the known portions of the island render it an unsuitable place for white colonization. In portions of the island explored by d'Albertis the water was so bad that the party was forced to rely on cocoa milk for their only drink

Major Daniels goes prepared, for all these emergencies. He has done other exploring of wild lands in his short lifetime and in his early youth. when he was a mere boy, he spent a number of years in the islands of the South sea. He visited New Zealand, Somca.

and some of the larger islands in the Polynesian group. He lived for months in Australla and became thoroughly informed on climatic and pathological. conditions of the whole western cific.
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He is no novice in the opening up of RI
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his
camera. These pic-
tures substantiated his report that something huge had caused a dis turbance on the lake.
a
Six months later
group of London sports-
men on a duck shooting trip watched in astonish-
ment as a
head on a
very
great snaky
knobby neck
rose from the water and

gazed intently at them. A member of the party got two pictures, shaky but proof that they had seer something strange indeed.

Crocodiles or Whales

When the reports of the Loch Ness monster reached the newspapers there were the usual swarm of self-appointed "experts" who claimed they could explain everything. They offered a wide variety of suppositions, varying from crocodiles to schools of fish and even a white whale.

Sir Edward Mountain, an English nobleman hired watchers to make records and films of fairly regular appearances of the "thing"

In October 1954, a driver stopped his bus so that his passengers could watch it playing around on the surface of the lake in a shallow cove. It was a dirty grey long-necked brute, just as Hugh Grey had described it 22 years before.

In December 1954, the fishing trawler Rival was crossing the lake wher the electronic echo sounder began charting an unusual object. beneath the boat. About 540 feet down something was swimming.

Radar had drawn a picture of an "object" that lives in Loch Ness. Certainly there's something there. But whether It is a monster has still yet to be proved.

-All Rights Reserved
strance in reale
TY FRANK EDWARDS
seen this tree in action was in 1878. Carl Liche, an explorer, was determined to see the phenomenon and was eventually taken in secret to see the tree by members of the Mkodos tribe to whom he had rendered a service.

The dance

According to his description the tree was eight feet high. It was shaped like a pineapple; dark brown in colour and had no branches.

At the top of the trunk was a cup-like depression, resting on what looked like a huge saucer. From underneath this saucer grew eight gigantic leaves. According to Liche, these were sword-shaped, two feet thick in the middle and at least twelve feet long with four feet of the tips resting on the ground. All over their surface were sharp, thorny protuberances. From the underside of the saucer burg hundreds of tendrils each about seven feet long.

Liche was allowed to see the ceremonial Dance of the Tree during which the natives, accompanied by monotonous beating of drums, worked themselves to frenzy.

At the peak of this they surrounded a naked woman and forced her, at spearpoint, to dance to the foot of the tree. Then she WIS forced to climb up the trunk and stand on the depression at the top.

and

At that moment, acced-
ing to Liche's story,
tendrils came to life
twisted and whirled around
the woman, who looked as
if she was in a trance.
At once the dancers
started screaming
"Taik!" meaning
"Drink!"
"T.uk!"
"Drink!"
The woman bert down
and drew some Quid from
the depression and drank it.
The tendrils wrapped them
selves around her until she
was completely encased.
Then the eight huge laves
rose in the air and closed
over the woman. Slowly
the edges met and pressed
inward until the victim was
lost to sight For ten
days the leaves remained to
that position. On the elev-
enth day they reverted to
Hermann Waldhausser,
47, had suffered headaches
and lack of sleep for twenty
years before he married
Christiane Reitz, 38, two
months ago. "The trouble
was that he was sleeping in
a bright yellow room with
gold-coloured
blankets,"
world of
star.
After
Carl For
tor," elfi
up by K
wood's t
"I
soon ha
to
MGM W
was
options I
said the bride. who is also
ar interior decorator.
changed the colours

soothing blue, and he
healed within two weeks.
Now I am adding warmer
colours because he sleeps
too much."
WERVICO, France:
MRS. VALENDUX LO-
RIDANT was awarded the
Order of Merit on the same
day as her husband. Be-
tween them, the happily-
married pair have totalled
125 years of work at
Dalle factory here. "I
sorry for women who
not work with their hus-
bands," said the French-
woman. "They are separat-
ed from the man they love
for almost half their wak-
ing lives."
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Paul New
ELKE SOMMER, lounging larily
dot ber Hollywood home.
'HE SUNDAY GLEANER MAGAZINE, NOVEMBER 20, 1966

[PAGE BREAK]

fresno bee republican
fresno california - 7-16-1933-
PLANTS that KILL ANIMALS

and
DEVOUR
their
FLESH
By Dr. Frank Thone
W
HEN animal bira a
ast, that is hardly me
Animals are doing that all
the time: cows and cater
lan, wice and men; they'd die vry a
they die.
But when a plax bites sanal there
may be interesting slay Thxe
ac, indeed, a great many interesting ten
that might be told of plants that eat ani-
ah, in spite of be fact that there am not
may rich plants, and that the mou ride
spread and senational of such st
Malm.
The tales alet de man-eating tre
of Madagascar abem the com
pletely hardy peremiel species in all pop
adar parado-mintide literature, and o
about the most everpletely wpened. They
with the similar yarms about the deadly
Upas tree of the Eet Jadies-the. tree
that was said to knock down mcn and ear
mal with is more poisonous breath
Bally the Madagascar moaler and the
poco-exented Upast go the way el
all myth. There are a tres that destruy
bet there are, all over the world.
mayaller plans that regularly ab
mah al inects and other wall
S
of the carmina vegetables
Ive in the tropics, et in these strange re
mots lands "down valor." Andrabs and
South Africa. Bet there are many of
that America. Some of these is
the water, and the mt, without caption,
Ers in boga
THAT is the secret of the strange hood-
thy habits of the plants-beg
wales. Reg water is sexd, and for socc
rearon not yet well understood acid water
prerests roots from getting dhe droger
which all plants must have
One of the principal constituents al mi
mal Bash is this same It is pr
marly to get it that reaches cal ment
and eys and cheats, and it is to gf -

Unge that some of the tregtarted
pleats of begs sad neid peads hare dat
oped their word, uscany aday to cap
hare and digent inets and other cropping
and swimming things.
b
Belants have kama alect the Brit
exting habals of some plants enly wil
comparatively recent times. Seas el the
plants they knew, but did net trafire what
their strange behavior may not
Ezamus Darwin, ler esam, the
dagatal wm was grandlathes
el the great perpixt of relaties, vrste
1790 tut de nily Imbaca el the
dew were of me to the plant by re
rating inerte free eating the leaves a
ut the bollen lees of the picherplat
were simply water containers. He apper-
ely had myxis of their true nature.
Hewert, Lapustio
vedomed the (mily ration in this pet
fer el his becks is a "
Matk gde lewat the
time about plans that were
An insect touches the "trigger" in
fixtop leal.
Like a stod trep, the jas iediately bega
le clac
Interlocking the cape of the victim
imposible.
Camp lckly 'm, he pleat digests it
SINCE D dry,
behave
el care, n
bir plaats their
The time here on
pui el Pel F. EUGU
te in Metres, he recently red pall
Don't believe the tale
about the man-eating
They may
Madagascar
be relieved to
rea
Phote by Camila Carre
One of the leafbeps of the pitcher plast, shou
ed by the nestor near the
adge of the pitcher his fated steps
the pet
ancts tamble and cant get cut pain
There are there types of active traps:
plants that add aggreative more t

the By per aange of the fast
shut on their pry like steel traps, and
phots that cage the prey.
tree of Madagascar, but strap, plants that man
here's one that's true
the modem descer bowlader of car
evores plants befere the Royal Society of
Counds, and itated remarks with m
tion pictures of his even faking
There pictures are among the most remark
able of watne a ever made. We kre
grow we to jgle pictures of fights between
tigers and water bullala, cobras and mo
But never before have
bera privlegal tool the-drody
work that goes can the file pegleswader
ford, where plants i imah d dereur their
In his very of the world for plants that
eat animals. Profemer Lyd found 440
species, belonging to 16 genera and grouped
mo be plat Lake This rally
cordingly mall aray, conridering the
ch
of therands el plaat species lawn and the
probully lang mula al vill d
covered
may perhaps be taken as an indication of
love bord it was I plan to lean the trick
of getting their feed by
PROFESSOR LLOYD lades all car
avors plants ale w mn g
the p
The pet cake their pery mothering
arting sticky rebeten dat ad he f
poper or by antar into which dis
Of the first of there five kinds of in
sect traps there are to examples endly
reached in America; and they are in
any case the least interesting of the inrect traps.
The sad type, however, the jalalt
is werdangly come in reme parts of the
United States and Canada; and it is more
over, the largest and most compcans of all
the caries plants
Plants belonging to this class are mostly to
be found in the various grera of pitcher plants.
Pilcher plants grow abondantly in lop wher
www they act in Cads,
and though
the Great Lakes region and en dra inta Ken-
rocky and Fland
THE most striking thing about them.
to the cal obterves, is the secure of

their leaver. There are hellourd into praceful
sose shaped "plays," with a perjecting ap
down en ride to take the place of the le
On the wyptending T of the pitcher, and
we will there are walt
tudes al down printing beetles, again which
se in cadd persibly clib. Below that is
an arra wabout histles, bet to
frantic inert feet to clutch Below this again
is another bordet
To make the trap the matrac. D
the are many clands that secrcke ectas,
like that off, hol which meets
ely fred.
More iter is the paper el eur
found abadeth father down the pher
THEY
fermentor
which
digests flesh just as the pepnin ef ear ows
stomach does
Even more widespread thes the pitcher
plants are the undews. The plant pow c
wt ad alt all over the world wherever
the checal reaction is acl enough
Mt of them are quite tiny plants eldes
more than a creple of inches acrom the whole
mette of the hey braves, ne more than that
high to the top of their little spire of flowers.
The kans are either rand er paddle
shaped, and each leal her a binge of projec
ing little fagers around its edge, and similar
leges all over its face. Each of these tiny
Sogen each island that secretes a sticky staff
that holds any at or other tiny iarect that
touches à as tanglefoot By paper holds a By.
But the action of the wadew trap i zot the
merdy passive action of By paper. When are
or more of a sticky-tipped fagers catches an
met, the wari waturally strutales. Thes
other lagen is the neighborhood, stimulated by
the net, slely be its direction, and
cach nets is icy lip on the lackles victim,
pinning him yet mort Erely,
PERHAPS me famous of all the carit
erous plants is the Venus' Aytrap, which in
found Baly in a limited area of the coastal plan
of the Cavaliam, principally around the city
of Wilmington, N. C
The leaves of this plant are perfect counter
parts of the steel trap wed by her trappen of
sheth Each is divided at its outer and in-
In por el culm. bene-edged ap

that hings along the mid and can cle: b-
gather is as Lais time as half a second
Exb of these Laps has three bristles on its
mfact, which are the triggers of the trap
When an inert alights en a leal, or a cal
par tank palang the sea, it camel anal
touching these trigger bristics. When it touches
the ft ear, wathing h. But a recend
later it was L
The tira stimuli folening one on the other
within a stated time, trip the internal mech-
am, whatever it may be, and the two halves
By Ingetber. The birds ee the outer edges
ink like the teeth of an aligator, that
Where to chance fer crea a rulline to
And Jva s tro hahr el te laat fist
ishlatle space between them, p
seether tightly, and the dinine glands
out their cerriding kes
The AID
Upon the and if I've lead-
The sticky tends t
-ing down on the cape
212 by Lauren 1A)
dhe repte in complete.

[PAGE BREAK]

Came
COPLIVE
the per capita Insurance is $550.
Q. Several days ago I read in a
n the paper that in central Africa there
grows a tree that draws and crushes
2 CAT- anyone accidentally touching it.
Va. Can you tell me anything of this?
and A. E. G.
ook.
Por
ma w
no g
ma.
Ha!
Raba-
her
ravel.
per-
CIBCO.
A. I is possible that you have
reference to the man-eating tree of
Madugascar. which is described by
Chase Oshorne, former governor of
Michigan, in his book on Aladagas-

car. Altho he slates that he has
nover seen this tree. the natives be
lieve in its existence and other
travelers claim to have ecen it.
This (roc is somewhat similar to
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Ger
N. Y., pineapple. of enormous size. and starte
contains an amber liquid which sunmi
when drunk affects the brain of the jarles
ature individual. The natives are accus- Dor
W. tomed to sacrifice individuals to the on
tree.
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Davenport Democrat and leader.
Davenport, Iowa.
2.21.1927

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nd
"ALABAMA'S LARGEST WEEK
Found It Impossible to
Locate Man-Eating Tree
There are undoubtedly plants which
eutrap and devour insects, and one
from India which lures mice by an
odor and traps and consumes the ro-
dent, but no one has been able to
prove the existence of the "man-eat-
ing tree of Madagascar." This story
was started about half a century ago
by a traveler who wrote a letter to a
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a sacrificial ceremony where a woman
was made a martyr, forced to meet
death in the embrace of one of these

trees The story traveled around the world and persisted to such an extent that many travelers and scientists who have visited the country since have made efforts to verify the story. Dr. Ralph Linton of the Field anthropological expedition spent two years in Madagascar and tried to locate a man-eating tree. He encountered several persons who believed that such a thing existed, but the tree was always in some other part of the country, and he arrived at the conclusion that the story was a myth.
cullman democrat - cullman alabama - 3-19-1931

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A SUNDAY. OCTOBER 29, 1893
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A STRANGE STORY.

The Man-Eating Tree of Central Amarica.

IT CAPTURES AND KILLS MEN

And Animals-An Interesting Blary of Adreature with a Bemark-able Vegetable.

From The St. Louis Globe-Democrat.

The next day Curnaos and I had decided upon a bust 14 tar Nuntains that made a Jagged outline gast the ky of to the south. Wale we were gettant cartridges futo condition for a tetrara approachell din bis mouthest tubes:

"If the or wet the valley, down be roud the Contadino pam, they would and where great pauber roms and has been meen many tim.s. Aniye.I saw it but the days up, but I was unarmed, so I put spurs to the horse and alied away."

Carilnos turned to me with a look of inter-est. Dat's good idea." he said. "We'll look for was panther rat, ab if we fail to find Lim we can try the us."

We were about to turn away when Ferrara stopped us, with traps. Heroad the Contadino pata," be said, "yun wils and a parrow tie.eding of castward down the FoLaw at trail a last mi valies.

Juli mo augé wuite ena a Leaured yarus w de rigat. At the lot of that clean. tour s been heel gain and again. As alla so Carlow and I went walking I WILD Wg stride toward the pass, & day tu tae, u ready for any surch Lute that car alone.

burt lae va taat etually did come. For wil the 21 Doar we passed through the Lust Dotribe aperience taat Ter les to Lhe but it suuriaid, sure.

We found te ju mere gap la the mos ta.ha. It usu Jur travel as auolin pass Tew net lander south ruru

Tu to be tu. Tue
wh ugh bu.uers and a
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tor alt tour we had all the exence we
Merues In habag orrt and around
structions.
AL List, boWETIT, We were clear of them,
and we adered our guns agala after a briet
real, alld tube and the trali
swag te bushes. It was soeb a path a
brau by cows or up-gd
Paluran p
paying very litue itiation to
1.Don, who was the trail, suddenly suppo
and walletid, bat is wirangy
I looked over his shoulder and there, la rue
yellow and was the uutetut track of a tean.
be easy traced it ang down the trai, tur
several bidrel Jant, and then it suddenly
as thougn the nwner of Ive tack
at turned nd bly she taick du
We bellowed it up to that puist
Dird at uur -r and
sand. Enat 14 very strang
A we ben lan dad Carl
might have be
Man looking for a tray or shing
Aut notice that Carlines uk after bis
Cartragen lite ute usely, and held his
gan in a hit. If y
at then the riff that Ferrara had described
atne into view, abua: 10 yards away, al
we turned out from the path toward this place,
in which the pautaer had beru oft vil.
Sterly best we started in that retien
when we were stariled by the lung.
of the panther Hell As Drary as we
oall Jedge it was at that very mont at
the base of the cll. We stopped insidias
at the und and then went strailng dow
the slope with es wateafal and
stretched to the utat. Yet we rut on Aud
ou. without acelag it, and middenly found
ontres at the base of the el, which had
lava hddry by the thick and tauged brush
through which we bid passed
Thrs we stopped and looked around, perrig
here and there through the boslit
easy to that the spor of grund
which
we stool bad been the hamut of a wild
suimal, for all about us bas lay bleaching a

the ground
1set nothing was to be
The far of the run, up to a belgar of twelv
to fifter feel, was covered with the matte
rendrils of a dead vine, apparently. It sad
denly appeared fo me that the janiber's dea
migat hark under the cha, hidden by the
vin and I was about to larestigate when
bralod not tea feel away, wounded the
Lorrilde ram of the panther
ntb of us whirled at Carfinom stepped
lark a little. In the moment of confusion I
failed to notice bla. but a litany be gire
beart-remling cry "Help help: quick, the
tree The man-eating tree
that t
Never will I forget that . Bur the sight
In stepping tark be had
stumbled agalust the deal for, as I had
Though it And then lo a moment every ten
dr. had e Instinet with life, and was
twisting and writhing about him with the m
Dorribly snake-lle melons, naited around his
In-ly sal leex biding his arias fght and
brunt.
drawn across a fare and clasped about lis
Already when I looked around be was help
During the single moment wille I stod
there looking at bini mutlonims with berrur,
his face lind e nm parple. And Thril
all at unre I need nyelf a litle and,
steblue my hunting knife from my Ill be
Can calling and slash.ng at the horrible,
writhing fredrils in the effort to cut their vic-
Um lon
1st before I bad raade three strukes so
thing bad caught my arm and brid ft. then
Puteng rawed w.fny beat my neck:
and then there were utbery around my baad
tez art.
over beal. 1/tylere at
wacrever
the maker monsters fuachel weat Her pa.
as though my Beah were ing tommy
bundy, fit my app.ng away,
but as it was going sudden.y the dark fare of
Ferrara peeped out of the busbre in front of
me and cr.ed with mark.ng aughter.
you enjoy your rivers. The
panther in wet far away, betere me
wait for him tal.. br vomes, Alias: Alio
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Tur shock of 2015ortnite, and I
Ferrara inra to Way, but all ni
am.da borus of inadiloss
er.and blu
and we
were surrounded by a wd of the laborers
tan the planiating. Rill, lung kulves they
cut and backed at the lot that work
Rol from ar TE.AP, and in a few
partey hail us free. How they got s
line I never knew.
It was not until the next day that I recover
ed emotionrates, and I was be to care
In my bed. we far try weeks. De cat
tions on my fare and hands left f
Wuands.
Arte a long time a heolog.
made dreadful wears. Tarne have
Rol gone, however, excep: the was en my neck,
the scar ieft by a cent pede.
fur
wine be ly as if dead St
eral days, al Tinery were .me when he was
pronounced traily dead. The be off
off aro
Lever
be roudang deiram, and it seemed st
Bot by meater. After awie.
taong, he did straggle hark lots r. be s
rath was wked and ma
ship to walkach as 10 yards
How did we happen to be rested! Why,
Bome of Ferrara's fellow-serrants had heard
. mattered imprecations as Ex
when we had gone and ther Aaw him ancak
away after us lary held a consultation and
deelded to follow. va.ways le..eved thar
Ferrara e relied around us, in ahead and
rated rae ty of the other him
Ture us on. I have
nhle to find
HET. Den b
to
at.
Actinal my strength
enough in fre: some te ruro.iv. and aske
One of tax reemers what they and dear with
Ferrara. be answered, with the sta
concern
-The GATO him to the
chor?"
MAG-rating free.
GRUESOME COMPANION IN DEATH.

A Fet Black Puake Winds Itself Abows Daleide Elsale's Arm.

From The New York Times

Charles Enele, alneteen years old. committed suicide yesterday afternoon in the dings und poorly furnishel little room in the boarding house at 238 Enst Forty-Sixth street, and as he Ly cold atul stili u cut a blacksnake (Tawled up and wand italf about the arm above the sid ingrs closed tightly over a revolver.

Eisele wax n taxidermist. Here and there ahont the room where be red were birds of y planing. Jointed will considerable kill. There were more on the walls and under the narrow cot weru several hundred of them,

Eisele did not go to work yesterday morn ing In the afternoon he visited his friend, Charles Melxel, at 34 East Forty Sixth street. He started for lane at 3 o'clurk after asking Melxel to come to his room in an bour

When Meixel called Elsele lay on the bed and at first he wrmed to be nuly shape Again and again his friend called him, lar there was no auswer

Eisele bad been ded more than an hour

Word was sent to the Twenty-Third pr cinct station ul Policeman John McDer mott went to Earle's root

He opened Ce door and then drew bark with a alder. The black make, al about the dead boy's arm, flashad up It head and turned its viciaus itself.

intruder while it slowly Rard the

From Meixel the policeman learned that the snake had been a pet, wbl Elsad owned for some time, and of when he had benu very fund. It was ullawed to crawl about the room at will. I'ntil recently au owl shared Eisele's affections with tlu: snake

Meisel told the polievan that Le mounted birds and animal Eisole's a- per gates were worth at least 1.)

Lisles faiber lives at GS Teuth avenue, Irat the young man had mit lived at le for nearly two years. In the nicide win f two letters addressed to its father, but neither gave a reason for its

ucl.
It is thought that loneliness and bam
kucas were what causes hita to end his
life.
He Would he Mesponsible,
From The Dostun Bulget.
A miulater of a prufurut New York
church, who was about to leave home for a
few days, was bidding goodby to his fam-
When he came to Bobly he took the lit-
the fellow in his arms and said "W
young man. I want you to be a good buy
and take plane of
Bobby prunisl unl the father departed.
leaving him with a very large and full a
previation of his respousility When
nr cuce anl be was called to say his
prayers the young guanilan expressed bla
w If an Tullow
0.1
. Land, pleza protect papa and Brother
Dick and Sister Alice aud Annt Mary atal
nil the little Junes bya nn Babiy But
you belo't trouble about man, for I'm
guing to look after her myadf."
DR PRICE'S
DELICIOUS
Flavoring
Extracts
NATURAL FRUIT FLAVORS.
Vanula
Lemon
Orange
Rose,etc
Of perfect purity-
of great strength
Economy in their usa
Flavor as delicately
and deliciously as the fresh fru
FACIAL BLEMISHES.
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JOHN H. WOODBURY, Dermatologist,
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Mon
ada evening news - ada oklanahoma - 4-21-1906
More Information Required,
An addition has been made to the
list of freak vegetation, a scientist
declaring that he recently discovered
opin. in the wilds of Australia a genuine
If is singing trec. We have heard of the
false upas tree, with its deadly odor; the
orld, man-eating tree, whose limbs
stretched forth to grasp and draw
Into a fatal embrace the unwary vic-
tim, and the balloon tree, which when
loosened from the restraint of all at-
tenuated roots arose in air and soared
away above the trackless wilds. But
the singing tree is something new.

Unfortunately, the scientist fails to give us the range of its voice or the style of music it prefers.-Cleveland Plain Dealer.

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